# The Chemical Age

**A Weekly Journal Devoted to Industrial and Engineering Chemistry**

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*NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.*

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## British Chemicals

To appreciate the advance made in British industrial chemistry in recent years it would be necessary to contrast the condition of this country, say, at the close of the war, with its condition as revealed by the present British Industries Fair at Olympia and Birmingham. The older heavy chemical products, in which this country previously stood well, have fully retained their place, but the advance in the manufacture of new products has been more rapid than can be easily appreciated. British dyestuffs would then have constituted a very limited exhibit as compared with those of foreign makers; to-day the actual dyestuffs made here and the variety and beauty of the articles in the production of which they are used form a splendid museum of achievement. At the time of which we speak, synthetic nitrogen compounds of British production were scarcely heard of; to-day they stand comparison with the output even of the I.G. At the stand of Industrial Solvents, Ltd., in a few unpretentious bottles, are a group of chemical products which formerly had to be imported but which are now made here in vast commercial quantities and of a quality equal to the best. In the matter of fine chemical and pharmaceutical products stand after stand testifies to the immense strides that have been made in the newer lines of research and production. If, indeed, one had to mention all the chemicals we now make for ourselves that were not made at the time of the Armistice, we should require an extensive catalogue merely for their names.

The chemical stands at Olympia, and to a less degree at Birmingham, promptly convey some sense of this progress to the expert; the pity of it is that it is so difficult to bring the fact home to the general public and to make them fully sensible of the nation's indebtedness to chemical industry. The exhibitors, however, have done their part well, and the chemical stands seem more attractive and better laid out than on any previous occasion. The fact that the Chemical Section is not an isolated unit cuts both ways. If chemists cannot congregate together in the entirely exclusive way they like, the exhibitors have the advantage of a much larger audience, whose presence does not interfere with business and, indeed, adds an appearance of business that might otherwise be missing. Observers all agree that this year the general attendance is wonderfully good, while business inquiries are reported to be quite up to the average.

## Silver for Chemical Plant

AT a time when a large and very expensive new chemical plant was being erected it was common to refer to it, on account of the high cost, as the latest gold-lined installation. It was, of course, a chemical engineering joke. The paper read by Mr. Donaldson before the Chemical Engineering Group on the use of silver for chemical plant suggests, however, that even the gold-lined article may not be so fantastically impossible as at first it appeared. For many years now, concurrently with the growth of the new science of chemical engineering, there has been a steady advance in the raw materials of plant construction. The older materials have been replaced by special metals and alloys, with special acid resisting properties; in addition to aluminium and similar products nickel has come into wider use, and stainless steel is now definitely recognised as a chemical plant material.

The cost, of course, has risen with the rarer quality of the metal or alloy, but in chemical works purity and wearing properties are so important as to make the initial cost, in many cases at least, a matter of secondary importance. The discussion at the Chemical Engineering Group's meeting definitely brings silver within the range of engineering possibility, and though it sounds at first impossibly expensive it is possible that the advantages may compensate for the higher cost. All this, however, has yet to be proved. For

the moment, the interest of the discussion lies in having fixed a new starting point. Silver, at least, is no longer ruled out as impossible. It has established a sort of negative case; what remains is to demonstrate its positive advantages and possibilities.

In this direction there is obviously considerable work yet to be done. For example, must silver to be usable in chemical plant, always be of the "Hall Mark" quality demanded in plate or coinage, or is there to be a recognised lower engineering grade? Again, there is the question of corrosion, of which tarnishing appears to be the first stage, and the further problems of its purity in relation to chemicals, its resistance to acids, and its behaviour under the super pressures and temperatures now in fairly common use. Anyone who has seen the havoc wrought on metals, such as copper, by acetic acid will realise that if silver represents a higher standard than the existing materials the question of cost alone cannot remain an insuperable obstacle. For the moment, however, the interest in the subject is speculative rather than immediately practical. Mr. Donaldson's suggestive paper and the stimulating discussion that followed it have started questions of the highest interest to chemical engineering, and may come to mark, not perhaps a new era, but at least a very important step in the advance of engineering thought and practice.

## Rules Affecting Chemical Industry

THE Association of British Chemical Manufacturers has done a very useful piece of work in publishing as a handbook of 24 pages "An Index to Acts of Parliament and Statutory Rules and Orders Affecting the Chemical Industry." The collection and arrangement of the information must have involved a considerable amount of time and labour. In view of the value of the publication to firms affected by such regulations, it has been decided not to restrict the circulation to members, and chemical firms or other bodies interested may obtain copies at 2s. each direct from the publishers, W. Heffer and Sons, 4, Petty Cury, Cambridge.

It has not been thought necessary to include a complete list of every statutory rule and order, but the index has aimed at covering those having a direct relation to chemical industry. H.M. Stationery Office already publishes a complete index to the statutory rules and orders in force on August 31, 1930, an annual volume giving the text, tables, and index to the orders and rules issued during each year, and an annual chronological table of all statutes in force, but as these are rather expensive publications, the condensed index now published should be distinctly welcome. The Association has decided to follow up the present index with an annual list of additions, the first of which will be issued at the beginning of 1932 in a form suitable for a card index. The scheme, therefore, is intended to enable chemical firms to provide themselves with fairly complete current information concerning the numerous regulations with which they have to comply. If the present index should be found to be incomplete, readers who note the omission of any Act or order by which they are affected are requested to notify the Association.

## National Economy

THE interest in national economy recently aroused by the parlous plight into which national finances have fallen and the way in which that interest has been focused and directed by the opportune publication of "Account Rendered (1900–1930)" are two most encouraging portents for the present year. Sir Ernest Benn's book has, indeed, achieved a nation-wide success, a fact, perhaps, not altogether due to the argument purely on the score of economy. Many people to whom the literature of political economy and business generally is a closed book have read "Account Rendered (1900–1930)." The reason is to be found in the emphasis laid by the author on the moral repercussion of material extravagance. As a consequence, the book has made an instant appeal to a host of simple people in all walks of life, concerned in minding their own business and holding firmly to the moral standards and sanctions that made this country great in the "eighteen hundreds." Such citizens are found in no greater proportions than among the trading and commercial classes of the community; hence the powerful appeal that the book has made to them.

### Books Received

MONEY VERSUS MAN. By Professor Frederick Soddy. London: Elkin Mathews and Marrot. Pp. 118. 3s. 6d.

AN INDEX TO ACTS OF PARLIAMENT AND STATUTORY RULES AND ORDERS AFFECTING THE CHEMICAL INDUSTRY. London: The Association of British Chemical Manufacturers. Pp. 24. 2s.

## The Calendar

| | | |
|---|---|---|
| Feb. 16–27 | British Industries Fair. 9.30 a.m. to 7.30 p.m. | Olympia and White City, London. |
| | Birmingham Section | Castle Bromwich, Birmingham. |
| 25 | Society of Dyers and Colourists (Midlands Section): 7.30 p.m. | University College, Nottingham. |
| 25 | Institute of Chemistry (Belfast Section): "Effects of Air Humidity on Cellulose." J. A. Matthew. 7.30 p.m. | Royal Belfast Academical Institution. |
| 25 | Society of Glass Technology. | Sheffield. |
| 26 | Institute of Metals (Birmingham Section): "Press Tools for Sheet Metal Working." J. L. Williams. 7 p.m. | Chamber of Commerce, New Street, Birmingham. |
| 26 | Society of Dyers and Colourists (West Riding Section): "Modern Organic Solvents and some of their Uses." Ellis Clayton and C. O. Clark. | Bradford. |
| 26 | Institute of Fuel: "The Marketing of Pulverised Coal." E. C. Lowndes. 6 p.m. | Grand Hotel, Birmingham. |
| 27 | Society of Chemical Industry (Newcastle Section): "Fused Silica in Industry." Dr. Burrows Moore. 7.30 p.m. | Armstrong College, Newcastle-on-Tyne |
| 27 | West Cumberland Society of Chemists and Engineers: "Fuel Economy in Iron and Steel." Dr. G. B. Slottman. 7 p.m. | Workington. |
| 27 | Institute of Chemistry (South Wales Section): "The Pathology of some Industrial Poisons." Dr. A. J. Amour. 7.30 p.m. | Thomas's Café, High Street, Swansea. |
| 27 | Oil and Colour Chemists' Association (Machester Section) (Joint Meeting with the Institution of Rubber Industry): "Colours used in the Rubber Industry." G. F. Thompson and E. V. Bratby. 7 p.m. | Milton Hall, Deansgate, Manchester. |

# Chemicals at the British Industries Fair

## A General Impression at Olympia

*The British Industries Fair of 1931 is now at the end of its first week and both in the appeal made and the general response, it is proving itself a worthy effort in the battle against trade depression.*

THE British Industries Fair forms an admirable illustration of the Englishman's habit of being at his best during adversity and current trade depression has brought forth one of the best efforts in recent years, both in the design of stands and the enthusiasm of their attendants. The organisation at Olympia this year seems to be greatly improved, it is less easy to lose oneself in the maze of streets and generally the exhibition is brighter and more alive.

* * *

A great stimulus to business has again been provided by the interest taken by the Royal Family. On Monday the Queen visited the cotton textile branch of the Fair at the White City, and on Tuesday, accompanied by the Duke and Duchess of York and the Duke of Gloucester, she spent over two hours at Olympia. A telegram from the Prince of Wales, who is helping forward British trade in the Southern hemisphere was read at the inaugural Fair Banquet held at Guildhall, London, on Monday night. The Duke of Gloucester proposed the toast of the Fair and emphasised the strength of the competition the British industry was facing from abroad and the supreme value of the Fair in helping to combat it. The Duke was present at the Birmingham section of the Fair on Monday and Princess Mary and the Earl of Harewood were among Wednesday's visitors. A great increase in business compared with last year's figures has been recorded, many large orders being directly traceable to the lead provided by the Queen. The number of buyers, both home and overseas, is also greatly in excess of last year.

* * *

The chemical section is notoriously one of the most difficult to endow with liveliness and appeal, but manufacturers seem to have acted on the principle which was stressed at the recent dinner of the British Chemical Plant Manufacturers Association of showing what a chemical product can do as much as the product itself. On certain chemical stands there has been in the past too great a tendency to rest content with the fact that the appeal was to the expert who knew what he wanted and was in no mood to appreciate mere display. On others there was just a somewhat bewildering collection which was in many cases as fatiguing to the expert as to the general member of the public, who instantly set off in quest of more easily comprehended stands. As a general policy the chemical exhibitors at the British Industries Fair cannot afford to neglect the non-technical users of their products.

* * *

Imperial Chemical Industries have as usual one of the most imposing stands in the Exhibition, and it is the centrepiece of the chemical section. The interior is used as a cinema hall in which lengthy films descriptive of I.C.I. manufactures are shown. The titles include "The story of Beautiful Colours," a film calling attention to the products of the British Dyestuffs Corporation, Ltd., and setting out some of the more spectacular methods of dyestuff manufacture; "Heavy Chemicals" with particular reference to the manufacture of sulphuric acid and caustic soda at one of the I.C.I. factories; "The Wallerscote and Winnington Works," showing the manufacture of soda ash and also the facilities provided for the recreation of workers; "Grassland Management," telling the story of I.C.I. fertilisers and research undertaken for the benefit of the agriculturist; "A visit to the Witton Works of I.C.I. Metals, Ltd., Birmingham," showing something of the manufacture of non-ferrous metals, sporting ammunition and the "zipp" fastener; and several other films devoted to explosives. Thanks to zealous work performed by capable lecturers I.C.I. films are becoming well-known throughout the country. With well-produced films like these, it is a form of publicity that is much appreciated by an ever-growing public.

* * *

The exterior of the I.C.I. stand is possibly less artistic, but of greater practical value than last year's. The alcoves along its sides are divided not by products, but geographically. At the back of each is a large map of one of the continents of the world ornamented with silver studs to indicate an I.C.I. headquarters. Beneath it is displayed a collection of products of the continent which call for I.C.I. commodities for their growth or manufacture and examples of chemicals which are exported there or supplied from a branch factory. A feature of the South American division is a model of the I.C.I. stand at the British Empire Exhibition at Buenos Aires, and a further "cross reference" is a notice in each alcove calling attention to the I.C.I. display at the artificial silk section at the Albert Hall. Last year the end of the I.C.I. stand was occupied by a motley, but very impressive, collection of I.C.I. products packed ready for export to distant parts of the earth and illustrated Chinese posters. This time there is a large relief plan of the whole of Olympia with arrows showing the chemical products that have been required to produce the exhibits in the particular sections.

* * *

Besides phosphorus and its derivatives, of which they are leading manufacturers, Albright and Wilson, Ltd., have a practical exhibit of the merits of silicon ester as a stone preservative and a paint medium. A motor-car exhaust manifold, which had been coated with silicon ester paint is shown after 36,000 miles running, with the paint apparently unaffected. A further demonstration is given with a strip of painted steel which is heated in an electric furnace and afterwards plunged into cold water without any injury to the paint. A model garage with painted asbestos sheet sides illustrates another achievement in paint manufacture.

* * *

An ingenious method of showing the ever-increasing range of "Planet" chemicals has been adopted by May and Baker, Ltd., of Battersea. Twelve containers of parent substances, such as mercury, acetone, arsenic, bromine, etc., are shown surrounded by representative compounds of which they are the principal ingredients, and each group or planetary system, is linked by coloured lines to an article in the next group. Several new products are shown, including magnesium hyposulphite for the treatment of asthma and other complaints. The results of much research during the past year are in evidence on the stand of A. Boake Roberts and Co., Ltd., among them new perfumes, deodorisers, and plasticisers. Metallic soaps with a very high metal content are shown, cobalt resineate with 7·3 per cent. cobalt being an example.

The fine chemical side is strongly represented and other important firms showing new and standard products are the British Drug Houses, Ltd., W. J. Bush and Co., Ltd., Hopkin and Williams, Ltd., Howard and Sons, Ltd., Thomas Morson and Son, Ltd., and Whiffen and Sons,

Ltd. Analytical and laboratory chemicals form a large display on the stand of the General Chemical and Pharmaceutical Co., Ltd., chemicals for the photographic and allied trades are shown by Johnson and Sons, dyestuffs and harmless colours and the articles to which they are applied by Williams (Hounslow), Ltd., and special chemicals for the oil, paint, rubber and perfumery trades by Thomas Tyrer and Co., Ltd. Well-known acids of various strengths are exhibited on the stand of Spencer, Chapman and Messel, Ltd., and alcohol derivatives on that of British Industrial Solvents, Ltd.

The Gas industry has its principal display at Birmingham, but both the Gas Light and Coke Co., and the South Metropolitan Co. have stands at Olympia, original in design and showing samples of by-products of the industry such as sulphate of ammonia, pitch, tar oils, naphthalene, carbolic acid, etc. The "coal cave" of the South Metropolitan Co. is certainly a very striking structure.

Moulded products have a section of the Exhibition to themselves this year and make a very extensive display of articles for electrical and other industrial and domestic purposes.

# Stands at the Birmingham Section

## Review of Chemical and Engineering Exhibits

*In our last issue we gave details of the various stands in the Chemical Section at the Olympia branch of the British Industries Fair. Many important chemical, and particularly chemical engineering, firms are showing at the Birmingham Fair and below will be found an account of the principal stands of interest to our readers.*

At Castle Bromwich, where the Birmingham Section of the British Industries Fair was opened on Monday by the Lord Mayor of the city (Ald. W. W. Saunders), the display is fully as large as last year. The majority of the 1930 exhibitors are again represented and in many cases have taken additional space. The demand for accommodation has been so great in fact, that the authorities are even now faced with the prospect of having to make extensive additions to the buildings.

Imperial Chemical Industries again have a comprehensive display, and the section devoted to the gas industries continues the extension which has been one of the marked features of the Fair in recent years.

The visitor is impressed by the growing prominence of oil, in its various aspects, in modern transport and in engineering equipment and mechanical processes. The many exhibits include petrol and benzol mixtures, refined oils, oils for hardening, quenching and tempering; fuel oils and oil storage systems. There are also shown insecticides, fertilisers, and jointing and valve-grinding compounds, and industrial oil burners.

Some of the latest enterprise of chemical manufacturers is demonstrated in the display of wood preservatives, bituminous waterproofing compounds, anti-corrosive paints, and cold emulsions, made from bitumen, for road work. The importance of tar for road work is well brought out.

From the varnish, enamel, paint and lacquer industries there are many exhibitors. A number of new enamels have been introduced during the past year and there is an increasing number of new cellulose enamels. Distinct progress is to be noted in the application of the resources of the painting and allied trades to industrial processes and needs. On the mechanical side much better spraying equipment is offered.

The section devoted to the National Gas Industry is under the control of the four national organisations. The co-operation of the manufacturers of gas equipment and the organising committee has resulted in an attractive display, compactly arranged with its own special colour scheme and occupying 41,000 square feet. The exhibits cover the whole of the activities of the industry ranging from plant for the carbonisation, purification and storage of gas, to mains and pipes for its distribution, and various domestic appliances. An exhibit of special interest to the gas, chemical engineering and allied industries, includes dri-gas and naphthalene extraction plants, condensers, tar-extractors, benzol, sulphate and tar recovery plants, oxide disintegrators, and ammonia gas scrubbers. The larger equipment is illustrated by photographs and models. There is also a fair amount of works equipment of special interest to the industrial chemist.

The gas furnace has become an integral part of factory equipment for manufacturers who have to carry out heat treatment processes, and included in the display are many new types. There are installed, too, cyanide case-hardening furnaces, and a plant for case-hardening and the heat treatment of steel by means of molten cyanide of sodium.

In the electrical group there is a large increase in the number of exhibits dealing with Bakelite and other moulding products, resin, etc. In the non-ferrous metal group, many new alloys are shown.

### Imperial Chemical Industries

In two directions the exhibits of associated and subsidiary companies of Imperial Chemical Industries at the Birmingham Section of the British Industries Fair are of exceptional interest.

The Nobel Chemical Finishes, Ltd., stand (13F/2) merits particular attention because of the company's policy of showing definite articles—scales, safes, fire extinguishers, etc.—which have been finished in their materials by the actual manufacturers. This year some entirely new finishes are exhibited for the first time, in addition to a large number of applied examples of the well-known "Belco" and "Necol" finishes. These are manufactured on entirely new lines, and must not be confused with any other synthetic finishes already on the market. The properties and quality of these new finishes may be briefly described as follows:—

*Nobel Low Bake Enamels.*—These enamels are of exceptional build, hardness and durability. They are resistant to heat, acids, weak alkalis, water and petrol. They have also di-electric properties. They stove hard in a relatively short time at a low temperature. Nobel Low Bake Enamels are supplied in a range of dark coloured enamels with suitable undercoats where desired. Clear varnishes and mediums for bronze and aluminium are also included in the range.

*Nobel Air-Drying Acid-Resisting Enamels.*—These enamels are made on similar lines to the Low Bake Enamels mentioned above, but they are air-drying and are specially resistant to the action of aicds and weak alkalis.

*Nobel "Dulux" Finishes.*—These finishes comprise in themselves a wide range of products, possessing extreme durability, great elasticity, flexibility and hardness. One of the outstanding features of these enamels is their excellent adhesion and gloss retention. They retain their gloss very much longer than any other material.

*Nobel One Bake Undercoats.*—The new Nobel One Bake Undercoating System may be the means of saving considerable time in the finishing shop. It is a system wherein successive coats are applied with air-drying intervals of ten to fifteen minutes. The whole system is then baked at a low temperature for a very short time.

The principal exhibit of the Cassel Cyanide Co. is an improved form of the Cassel Cyanide case-hardening furnace. This is seen working under heat, and is available for the making of samples and for demonstration purposes. Case-hardening is, in fact, done literally while you wait—in a few minutes. The Cassel pack-hardening compound is also shown, and a Cassel heat treatment salt. There is also on the stand a machine known as the Cyanofumer for the production of hydrocyanic acid, used for the fumigation of citrus trees.

### Ruston and Hornsby, Ltd.

The exhibits of Ruston and Hornsby, Ltd. (Stand 15J/1), the well-known oil engine specialists, consist of a wide range

of oil engines suitable for the average oil user, although the large engines which they at one time exhibited at the Fair are absent on this occasion.

The engines represent a completely new range of units. Users of horizontal engines will be interested in the latest class "HR" engine, a unit which runs on the well-known Ruston principle of airless injection; runs on either crude or residual fuel oils, with a guaranteed low consumption; starts from cold without any form of pre-heating, and is extremely simple in operation. This type of engine has found great favour amongst factory owners who look for cheap power and light. The engine exhibited is 22 b.h.p., and represents a range which is manufactured up to 132 b.h.p.

Vertical engines are represented by two high-speed units. One engine, known as the Mark "VQ," is a 6-cylinder unit running at 900 revs. per minute, at which speed the normal working load is 96 b.h.p. This is a totally enclosed engine with forced lubrication throughout. It can be supplied for land or marine duty; but is shown at the Fair as a land engine for ordinary industrial purposes, being fitted on a cast iron base. This engine starts from cold and runs on a wide range of crude or residual fuel oils.

The second high-speed engine, known as the "JP," is a 4-cylinder unit running at 1,000 revs. per minute, at which speed the working load is 35 b.h.p.

What is believed to be an entirely novel exhibit at the British Industries Fair is the staging of engines in course of erection. In the absence of lifting tackle, and the necessary space for building a larger engine, this demonstration is carried out in connection with the Ruston totally enclosed petrol-paraffin engine—Mark "PB." Engines are shown running, being dismantled and re-erected, ready for further running, one of the objects being to demonstrate the perfect interchangeability which is secured by machining to the fine limits which are imposed under Ruston-Hornsby methods of manufacture.

In view of the present-day need for the greatest fuel economy by all steam users, considerable interest will be centred around the patented vertical boiler, with which a fuel economy of at least 20 per cent. over the normal vertical boiler is secured. In addition, a range of Ruston centrifugal pumps will be on view.

### Thomas Howse, Ltd.

This firm (Stand 7G/3) are exhibiting the latest types of finishes in "Ferret," Howse's "Q" Brand, "Thermax" and "Graphax" paints and enamels, "Derustal" and "Bitumak" paints, Howse's varnishes, "Ferret" and "Thermax" stoving japans, "Sellonite" air-drying and baking cellulose lacquers, "Infuselin" and "Infuselax" synthetic resin lacquers, "Sellonite" 3-hour oil lacquer, Howse's water paints and "Kinecco" plastic and acoustic finishes for hardware, motor and cycle accessories, steel furniture, domestic and toilet articles, etc. The accepted standards of industrial finish will be found alongside the very latest types of decorative and protective surfaces obtained by the most modern methods of application and most economical operation.

The latest products of the colour makers' science are seen combined with the craftsmanship and technique which the newer media and appliances produce to render modern products attractive and more serviceable. Skilled representatives are in attendance to discuss finishing problems and programmes.

The metal-cutting lubricant ("Transol," "Thresol," "Soluol," "Sollovene,") "Corrosine" metal preserving, and "Derusta" rust-remover branch of the business devotes space to the exhibition of the latest types of high-speed cutting compounds and preserving compositions for bright steel and metal articles.

The President's room at the Exhibition has been decorated in "Kinecco" plastic paint, and the main entrance hall has been decorated with "Ferret" hard gloss paints and Howse's oil-bound water paints, "Kinecco" imitation stone exterior finish and "Graphax" steel work paints.

### G. A. Harvey and Co. (London), Ltd.

G. A. Harvey and Co. (London), Ltd., have recently made extensive additions to their works, and particularly the departments set aside for the construction of industrial plant and steel furniture, and they have also taken greater space for their stand, 9K/3. Of outstanding note in their display is the extensive range of perforated metals. They have had nearly sixty years' experience in the perforating of all materials and one is astounded at the many purposes for which perforated metal is required. This firm certainly possess a plant second to none for economical production, and visitors seeking information on the subject of ornamental work, radiator covers, grilles, ventilator panels and pipe guards should get a copy of Catalogue No. 355 and examine the examples of craftsmanship displayed on the stand.

In view of the progress that is being made in this country in the canning industry, the exhibit of a vertical processing retort on this stand is of great interest. The specially constructed swing bolts and perforated baskets offer many advantages for easy, safe and rapid operation. Harvey and Co. also manufacture all kinds of apparatus for use in food manufacture, including horizontal processing retorts, cooling tanks, sterilisers, jacketed pans, washers, vacuum drying and evaporating pans. Many kinds of industrial plant are undertaken complete at these extensive works, the more important relating to the chemical and allied trades, comprising steel plate work up to 1½ in. thick, and bulk oil storage tanks up to 116 ft. diameter.

### British Road Tar Association

Space has again been taken at Birmingham by the British Road Tar Association. The stand, 12B/1 is designed to permit visitors to familiarise themselves immediately with the merits of tar for the construction and maintenance of roads. The base of the stand is composed of various types of tarred materials, and visitors have every opportunity of examining examples of durable and safe tar roads, which constitute the greater mileage of our highways throughout the country. British tar can justly claim to have been the earliest of all modern road-surfacing materials. Made to specification it has all the characteristics essential for the construction of road surfaces capable of withstanding modern traffic conditions, and is easy to apply and economical to maintain. In addition, the non-skid properties conferred by the use of tar on existing smooth road surfaces are now universally admitted. The British Road Tar Association invites all those who are interested in the construction and maintenance of roads to visit the stand, where every opportunity is given to discuss questions relating to the use of tar for roads with technical representatives.

### Meldrums, Ltd.

Meldrums, Ltd., Timperley, Manchester, the fuel combustion, refuse destruction, and acid resisting metal experts, are exhibiting on Stand 7L/2 a model boiler front. On one flue is fitted one of their mechanical stokers of the sprinkler type. This machine is noteworthy in many respects, but the chief feature is that it is the only stoker made with a double or hollow front, which in these days of smoke prevention is a big point. In the elimination of smoke there are two conditions vitally necessary—namely, a high furnace temperature and the admission of secondary air under control. This hollow front carries steam jets which enable the passing of extra air down and through the hollow fronts. The air becomes heated in passing, and is admitted to the furnace through perforated side baffles. Being regulated by wheel valve, it can be set to suit the rate of combustion, thus ensuring instantaneous and positive smoke prevention. On the other flue is fitted one of this firm's hand-fired forced draught furnaces with closed ashpit, under pressure by means of two steam jets per flue, and embodying their valvular deadplate and smoke preventing bridge—two positive features not found in any other furnace.

In the Exhibition yard is installed one of the firm's range of steel-cased refuse destructors, and this can be seen daily in operation burning the Exhibition refuse. Smaller sizes of destructors can be inspected. A range of "Meldrum" acid resisting metal fittings, including a centrifugal pump, pipe line, valves and tank, as well as cocks and valves, acid elevators and steam jet apparatus, are also on view.

### W. and T. Avery, Ltd.

The Avery productions which are shown on Stand 15L/1 appeal to home and overseas buyers alike. For the first time blending machines are represented by a power driven

model fitted with special glass inspection windows and coloured interior illumination. The machine is in continuous operation, and demonstrates how thorough it mixes dry free running material. Another interesting exhibit is a portable power driven totaliser with a specially enlarged dial and indicator. Avery industrial visible weighers are represented by four different types of machines—viz., an overhead track scale, complete with the necessary lengths of dead track, and supporting structure; a modern high capacity dormant machine; a new patented unit Count machine; and a new type milk weigher. Testing machines are represented by two machines especially useful for conditions of mass production. They are a new type direct reading hardness testing machine and a visible self-indicating spring testing machine. The stand design is simple almost to the point of severity, with a small combined literature display cabinet, incorporating a telephone booth and photograph gallery at one end. Writing tables and comfortable chairs are available for visitors desiring to discuss their problems with Avery representatives.

### Redler Conveyors

The Redler System of conveying, displayed on Stand 18F/1, is applied in various ways for handling materials which are not liquid on the one hand nor single units on the other, but between these extremes it will be appreciated that there is an immense number of substances which are required to be handled in bulk form, *i.e.*, "en masse." The feature of the Redler Patents exhibit is the 30 in. circuit Redler which has an elevating capacity of 600 tons per hour of grain and which will be running slowly and elevating half this tonnage during the period of the exhibition. This type of conveyor is also used for conveying other materials. Another most interesting exhibit is the Tubular Redler for conveying powdered materials "en masse" through a tube of rigid or flexible form, horizontally, inclined, vertically or around right-angled bends as required. The Standard Redler for conveying horizontally is shown working in conjunction with the Uniflow Redler, which lends itself to longer distances and materials of greater density, abrasive, or of a sticky nature. The Circuit-Duo Redler conveys in any position and the material can also be delivered from one or more points.

### Cellactite and British Uralite, Ltd.

This year the Urastone exhibit of Cellactite and British Uralite Ltd. (Stand 12C/2) includes new features. Various fittings to overcome draught and other troubles are shown, made up in the firm's incorrodible material. Cellactite steel-cored incorrodible corrugated roofing, another of the firm's products, is now available in gauge cores stouter than previously, with wider purlin distances and a consequent saving in structural cost to the purchaser. Asbestone (asbestos-cement) in the form of cooker bases, fire surrounds and hearths and roofing is also exhibited.

### The Foster Instrument Co.

Few of the general public who use gas, and not all the engineers who make gas, realise the services which have been rendered by scientific instruments in the improvement of quality and reduction of cost which have taken place in recent years. The gas works manager who wishes to be up-to-date in all the methods of heat measurement now at his command, will do well to see the demonstrations by the Foster Instrument Co. on Stand 12L/2. The "Lamp-bridge Unit" optical pyrometer puts into his hands a means of measuring temperatures in gas retorts and settings in a very easy way, and another valuable instrument is the Blackie heat-flow gauge which measures directly the heat loss from any surface. With this, engineers can quickly determine where their major heat losses are, and how they can reduce them.

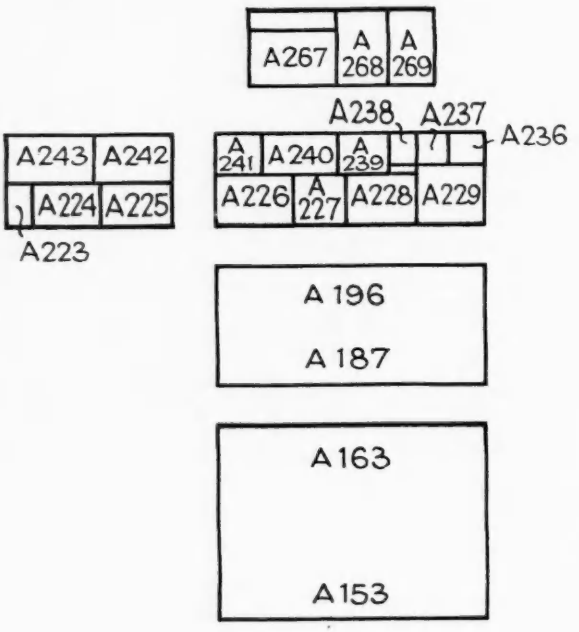
### Asbestos Cement Building Products, Ltd.

The exhibit of Asbestos Cement Building Products, Ltd., on Stand 11D/1, consists mainly of their "Everite" asbestos cement flue pipes and fittings. A special display is being made of industrial fittings, including a large dust box and 4 ft. diameter pipes. Special "Everite" ducts for acid fumes, of great interest to the chemical industry and managers of by-product works, are also shown. A very great advance in the finish of this firm's products will be noted, as the result of the extensive modern pipe manufacturing plant installed at their factories.

## Scientific and Optical Instruments

### Exhibitors at Olympia

BELOW we give a list of the exhibitors in the scientific and optical instrument section at Olympia with a diagram of the layout of the section, which is next to the Canadian section and at the opposite end of the Grand Hall from the chemical exhibits.




| *Name.* | *Stand No.* |
|---|---|
| Baird and Tatlock (London), Ltd., London | A.187; A.190 |
| Charles Baker, London | A.153; A.163 |
| Barr and Stroud, Ltd., Glasgow | A.267 |
| R. and J. Beck, Ltd., London | A.153; A.163 |
| F. E. Becker and Co., London | A.187; A.196 |
| Bellingham and Stanley, Ltd., London | A.153; A.163 |
| B. Black and Son, London | A.241 |
| British Hanovia Quartz Lamp Co., Ltd., Bucks | A.269 |
| Broadhurst, Clarkson and Co., London | A.187; A.196 |
| Cambridge Instrument Co., Ltd., London | A.153; A.163 |
| C. F. Casella and Co., Ltd., London | A.153; A.163 |
| Chance Brothers and Co., Ltd., London | A.153; A.163 |
| Cooke, Troughton and Simms, Ltd., London | A.153; A.163 |
| Curry and Paxton, Ltd., London | A.224 |
| G. Cussons, Ltd., Manchester | A.187; A.196 |
| J. H. Dallmeyer, Ltd., London | A.153; A.163 |
| Ellis Optical Co., Croydon | A.227 |
| Ensign, Ltd., London | A.153; A.163 |
| A. Gallenkamp and Co., Ltd., London | A.187; A.196 |
| W. and J. George, Ltd., Birmingham | A.187; A.196 |
| Gowllands, Ltd., Croydon | A.187; A.196 |
| Theodore Hamblin, Ltd., London | A.240 |
| Charles Hearson and Co., Ltd., London | A.187; A.196 |
| W. H. Harling, London | A.225 |
| Adam Hilger, Ltd., London | A.153; A.163 |
| Henry Hughes and Son, Ltd., London | A.187; A.196 |
| R. W. Munro, Ltd., London | A.242 |
| Negretti and Zambra, London | A.153; A.163 |
| Newton and Co., London | A.187; A.196 |
| Newman and Guardia, Ltd., London | A.187; A.196 |
| George Nobbs, Ltd., London | A.239 |
| L. Oertling, Ltd., London | A.187; A.196 |
| W. Ottway and Co., Ltd., London | A.153; A.163 |
| Ross, Ltd., London | A.153; A.163 |
| Short and Mason, Ltd., Walthamstow | A.226 |
| W. F. Stanley and Co., Ltd., London | A.153; A.163 |
| James Swift and Son, Ltd., London | A.187; A.196 |
| Tintometer, Ltd., Salisbury | A.237 |
| United Kingdom Optical Co., Ltd., London | A.153; A.163 |
| W. Watson and Sons, Ltd., London | A.153; A.163 |
| E. R. Watts and Son, Ltd., London | A.153; A.163 |
| Wray (Optical Works), Ltd., Bromley Hill, Kent | A.236 |

# A Survey of the World Position of Nitrogen.—(I)

**By G. C. Riley, M.A., B.Sc., and H. G. Bott, Ph.D., A.I.C.**

*The following paper was presented by the authors on Saturday, February 7, at the works of the Chemical and Metallurgical Corporation, Runcorn, before the members of the Manchester and District Junior Gas Association.*

THE original and only source of our combined nitrogen was that in the atmosphere, and this at present constitutes our largest source. The air over a single square mile of the earth's surface contains about twenty million tons of free nitrogen, and it is evident that the supply is practically inexhaustible in comparison with our needs. The total amount represents nearly 6,000 million times the nitrogen in the annual world production of Chile nitrate and ammonium sulphate at the beginning of the war. Nitrogen in the free, or uncombined, state, however, is one of the most inert of the elements, and has no commercial value as such. It is only comparatively recently that it has been found possible to combine, or "fix," it in commercial quantities.

## Free Nitrogen

A relatively small amount of this free nitrogen probably always has been fixed by natural electrical discharges round the earth, and brought to the earth's surface by rain in the form of nitric or nitrous acids. The amount formed is definitely larger during thunderstorms, but it is always present. Free nitric acid has been reported, but it is generally combined with ammonia, either directly formed as ammonium nitrate in damp air, or by combination with ammonia given off by organic decomposition on the earth's surface.

Various estimates of the amount of combined nitrogen returned to the earth's surface in lbs. per acre per annum have been made, of which the following are examples :—

| | Total Nitrogen (Nitric and Ammonia). |
|---|---|
| Rothamsted, England ..... | 3·84 |
| Paris ..... | 8·93 |
| Belgium..... | 9·20 |
| Utah, United States ..... | 5·42 |
| Kansas ..... | 3·69 |

The other method of natural fixation is that carried out by cymbiotic bacteria in conjunction with certain plants. It has long been known that leguminous plants have the remarkable power of producing nitrogenous proteids, even when the soil does not contain nitrogenous compounds. On this was based the idea of "the rotation of crops." It was later shown by Hellriegel and Wilfarth that the nodules on the roots of these plants contain colonies of bacteria, which penetrate the roots of the plant and the surrounding soil, and pass on the nitrogen of the atmosphere to the growing plant in an assimilable form. Cultures of these bacteria placed on the market for inoculating soils deficient in them have proved fairly satisfactory. There are, in addition, two well-known classes of bacteria which play an important part in the supply of nitrogen in the form of nitrates in the soil.

The remaining chief natural source of nitrogen in the soil is decaying organic matter and animal refuse. This nitrogen is present as ammonia or amino-compounds, and as such is valueless for the fertilisation of growing wheat, etc. It was well known that the nitrates in the soil acted as fertilisers, and in the early part of the nineteenth century it was recognised that these nitrates were obtained from the organic nitrogen. It was shown by Frankland and Winogradsky that this nitrification was due to two classes of bacteria, one of which converts ammonium compounds into nitrous acid, while the other oxidises the nitrous into nitric acid, this conversion being active near the surface of the soil, where it is assisted by aeration. In an acre of arable soil the top nine inches of humus contains 2,500 lbs. of combined nitrogen. In the spring there will have been produced about 25 lbs. of available nitrogen. This corresponds, roughly, to 1 cwt. of ammonium sulphate spread over the same area.

## Atmospheric Nitrogen

The nitrogen of the atmosphere thus undergoes the well-known "nitrogen cycle." It is fixed by electrical discharge, or by the symbiotic bacteria, to nourish living plants as a nitrate. The plants in part form food for animals, in part die and decay. The waste animal products also decay, and from both decompositions are set free some nitrogen, which returns to the atmosphere, and some ammoniacal products, which are converted by the nitrifying bacteria into nitrates, again to form food for plant life. These are soluble, and a portion is lost by solution and flows away to the sea. A portion is also lost as waste animal products, which are not returned to the land. Thus, under purely natural conditions, there is a continual decrease in the nitrogen available for producing foodstuffs.

This problem can be attacked in two ways—by cultivation of additional virgin soil, and by addition of artificial fertilisers, as has been practised scientifically since Liebig, in 1840, pointed out the true functions of nitrogen, phosphorus and potash. Apart from animal manure and guano, the only other source was natural deposits of nitrates, of which the well-known Chile saltpetre was by far the most important.

## Progress of the Synthetic Industry

After the war the great strides taken by the synthetic nitrogen industries, and the consequent competition, shook the Chile nitrate industry to its foundations. Its striking recovery was due to the formation of a centralised selling organisation and the adoption of improved technical methods, culminating in agreements with the synthetic and by-product ammonia manufacturers. Thus the production, in 1928, was approximately 2,600,000 tons, and in 1929 approximately 3,100,000 tons.

It was calculated in 1917 that the explored nitrate grounds alone contained over two hundred million tons of utilisable nitrate, and at the rate of three million tons per annum, should last at least 70 years, without making allowance for the inferior deposits capable of utilisation. The supply, therefore, is not in danger of being exhausted by the end of this century.

It has been estimated that at least two-thirds of the pre-war consumption of nitrogen was in agriculture. The consumption in tropical countries is small, as nitrate is easily washed out of the soil, and in swampy soils is reduced by bacteria to nitrite, and even to gaseous nitrogen. The remainder was used in the manufacture of sulphuric acid by the chamber process, and of nitric acid.

During the war, of course, its use for the latter purpose predominated, and enormous quantities of nitric acid were produced for the preparation of gunpowders, nitroglycerin, and nitrocellulose explosives, picric acid, trinitrotoluene and ammonium nitrate. The use of explosives on this scale resulted in a colossal waste of fixed nitrogen. Taking the case of a high-explosive shell containing 100 lbs. of a mixture of T.N.T. and ammonium nitrate in such proportions that, theoretically, the contents on combustion would be totally decomposed into nitrogen, carbon dioxide and water, the potential volume of the gases at N.T.P. on explosion would be 1,370 cu. ft., and the wastage of nitrogen would be 29 lbs. on one shell alone. Thus the consumption of fixed nitrogen rose from 76,300 tons in 1913 to 1,122,000 tons in 1916-1917.

## By-Product Sources

The other chief natural source of combined nitrogen is coal (also peat and bituminous shale). All these contain a small percentage of nitrogen, although in ordinary destructive distillation only about 10 to 15 per cent. of it is given off as ammonia. No mention of the products of the composition of coal appear before the latter part of the 17th century. Becher, in 1681, took out the first English patent relating to the destructive distillation of coal, and Clayton, in 1738, noticed that combustible gases were given off as well as tar, but it was probably William Murdoch, late in the 18th century, who first thought of producing illuminating gas from coal, and the first private gas works was erected in 1798. Tar and gas liquor forced itself upon the notice of the gas manufacturer as a by-product which was a necessary evil, and which could not very well be thrown away without creating a nuisance. The liquor was sometimes worked up for ammonium salts, but as this was not very profitable, as much as possible was disposed of in other ways, even up to the 'seventies. With

the increasing application of scientific knowledge to agriculture, the position changed, and it began to be realised that here was a natural source of nitrogen compounds which would rival that of the Chile nitrate.

The increased demand for ammonia for agriculture, for the Solway ammonia-soda process, and other purposes, converted the gas liquor from a source of trouble into a valuable by-product, just as the demand for coal-tar products did for its companion—coal-tar. Thus, by one of the strange coincidences which so often take place, the unlocking of this great source of combined nitrogen deposited in the carboniferous period coincided with the new and increasing demands for the product. With the rapid development of the gas industry large quantities of nitrogen products were available. In 1880 ammonium sulphate became available also from by-product coke ovens. The approximate production in 1880 was 250,000 tons, in 1890 400,000 tons, and in 1900 500,000 tons.

No difficulty was found in absorbing these quantities in agriculture and industry, and it became a matter of concern that the available supplies of nitrogenous materials were likely to become inadequate to produce the foodstuffs necessary for the growing population. Sir William Crookes, in his Presidential address to the British Association at Bristol in 1898, pointed out that our only hope was to harness the unlimited supply of nitrogen in the atmosphere, and confidently predicted that "before we are in the grip of actual dearth, the chemist will step in and postpone the day of famine." He himself at the Royal Society in 1892 had demonstrated the "Flame of burning nitrogen," and Lord Rayleigh in 1897 had succeeded in effecting the union of 29·4 grams of nitrogen and oxygen with the expenditure of one horse power of electrical energy.

### Recent Developments

Dr. R. E. Slade, in his paper on "The Nitrogen Industry and Our Food Supply," which very appropriately was read to the British Association, again at Bristol, in September, 1930, reviewed Sir William Crookes's prediction in the light of accomplished fact. The anticipated difficulty has been overcome up to the present. This has been made possible by the increasing use of fertilisers available through synthetic production, but the increased yield by their use in some countries has been offset by other cases where intensive cultivation has made it profitable to work with smaller yields. The world production of wheat has reached the figure of 4,400 million bushels, about 30 per cent. more than Crookes estimated we should require.

The developments in this century have been mainly concerned with the synthetic production of nitrogen compounds from the air. Lord Rayleigh's work in 1897 led to further investigation along similar lines, developing into the arc process for the production of nitric acid. By passing air through a high voltage alternating arc spread out into a thin sheet quickly torn away from the electrodes, and rapidly cooling the gases, nitric oxide is formed. It is comparatively stable at the temperature of the arc, about 3,000° C., and is also stable below about 1,300° C. When cooled below 600° C. it oxidises with the excess air to nitrogen peroxide, and on absorption by water it gives a mixture of nitrous and nitric acids. The first successful commercial process was that of Birkland and Eyde, established in 1903–1904 at Notodden, in Norway, where there was abundance of cheap water power available.

The process was developed and in 1906 was financed by the Bayer and Badische companies of Germany, and rapidly produced commercial quantities of the product. In the Birkland-Eyde furnace the arc is spread by a strong magnetic field into two semi-circular discs of flame, which rise and break with great rapidity. The flat chamber surrounding the flame is made of refractory material, kept below 1,000° C., and the gases, after combination, are led away for cooling and absorption. The best results have been obtained with large furnaces with a capacity over 3,000–4,000 h.p. Since the successful exploitation of the Haber process in Germany, the German firms have withdrawn their financial support, and the undertaking is now in the hands of a Norwegian company. Several other types of furnace have since been developed. In the Pauling furnace the arc is struck between the nearest points of water-cooled electrodes, which then diverge in the shape of a "V" into the combustion chamber. There were six factories in operation with this type of furnace, three being in Germany. In the Kowalsky and Moscicky furnace, the arc revolves in a water-cooled chamber under the influence of a powerful magnetic field. In the Schonherr furnace, a long slender arc is developed in the axis of an iron tube. This was in operation in Norway and Germany. Processes have also been developed, in which the air entering is previously enriched with oxygen obtained from a Linde machine. For the oxidation and absorption of the nitric oxide produced, enormous towers are required, as there is an appreciable time factor in the oxidation and decomposition.

### Calcium Cyanamide

The other process of nitrogen fixation, which was developed in the early years of the 20th century, was the calcium cyanamide industry, in which nitrogen is combined with calcium carbide at a high temperature to give a mixture of calcium cyanamide and carbon. Its commercial production was started in 1905 in Italy.

Calcium carbide is first produced by fusing a mixture of lime and coke or anthracite in an electric furnace, and the finely ground carbide subjected to the action of nitrogen in a furnace. The nitrogen was originally produced by passing air over heated copper, but it is now made by the air liquefaction process. The product is crushed and treated with water to decompose free carbide and phosphide, and hydrate the free lime, treated with oil, and is then sold as "nitrolim" for agricultural purposes.

An important use for it was the preparation of ammonia, which is easily carried out by steam under pressure.

A large factory was started at Odda in Norway in 1908, and the process was rapidly extended. The world output of 500 tons in 1906 grew rapidly to 157,000 tons in 1913. Norway at this time was also producing 73,000 tons of nitrate of lime by the arc process.

A factory at Niagara at the outbreak of the war had a capacity of 64,000 tons of ammonium nitrate per annum. In 1917 the American Cyanamide Co. formed a subsidiary company to erect the U.S. Nitrate Plant No. 2 at Muscle Shoals, for a capacity of 110,000 tons of ammonium nitrate per annum. This cost £12,000,000 and employed 20,000 men. Plants 3 and 4 were in process of construction at the time of the Armistice. These plants became somewhat of a white elephant after the war.

### The Haber Process

The greatest step forward has resulted from the researches of Haber on the production of ammonia from nitrogen and hydrogen. Haber and his pupils were working on this subject from about 1905, and the Badische Co. took up the process in 1910. With the collaboration of Bosch it was rapidly developed on the commercial scale, 30,000 tons of ammonium sulphate being produced in 1913. The process consists in circulating a mixture of pure nitrogen and hydrogen at a pressure of 150–200 atmospheres, over a special iron catalyst at about 600° C. About 8 per cent. by volume of ammonia is formed at equilibrium, and this is washed out and the gases recirculated. Special technique had to be devised for working on a commercial scale with such pressures. The Badische Co. obtained the hydrogen from water-gas, which was subsequently treated by the Bosch process with steam and ferric oxide catalyst to convert the carbon monoxide into carbon dioxide and hydrogen. Owing to the war demands, the Leuna works was also erected, producing the mixed gases by treating a mixture of producer gas and water gas by the Bosch process. In 1918 the combined production of nitrogen compounds by these two was equivalent to about 900,000 tons of ammonium sulphate.

The fixation of nitrogen by this process has proved so much cheaper than by the arc or cyanamide process, that its development has quite outstripped the others. The production of nitric acid by oxidation of synthetic ammonia over platinum, introduced as a war measure, has become of increasing importance since 1922 in comparison with other sources of nitric acid. An American process has proved of so much lower installation cost and more efficient in operation than the processes in Europe, that it has revolutionised the nitric acid industry of that country, and the process is now being licensed for use in Europe.

*(To be continued.)*

# Silver for Chemical Plant

## Views of Chemical Engineers

At a meeting of the Chemical Engineering Group of the Society of Chemical Industry, held in the Institution of Civil Engineers, London, on Friday, February 13, a paper on "Silver and Its Application to Chemical Plant" (of which a summary was published in The Chemical Age last week) was read by Mr. Donald MacDonald (Johnson, Matthey and Co., Ltd.)

Mr. George Gray (Chairman of the Group) in opening the discussion on the paper said that everybody would realise from what the author had said that there was a great deal to be done in the application of silver to chemical plant. As chemical engineers they must turn their faces right against any idea of the monopoly value of silver. If silver was to be a valuable metal to chemical industry and to chemical engineering, then he was strongly in favour of the view that had been expressed by the Metals Bureau that restriction could not economically be introduced. One matter which required considerable attention was the repair of plant made of silver, because it would be a serious matter to firms installing such plant to have to pack it up and send it back to the makers for repairs. According to the paper, these could only be carried out by skilled operators, and he was wondering if it could be hoped that the necessary knowledge might become more widespread. That certainly would be an important step forward in the greater utilisation of silver for chemical plant. Then there was the question of tarnishing of silver apparatus. Here there seemed to be great scope for stainless silver, and especially for articles other than chemical plant because the great falling off in the use of silver articles generally had been due to the trouble of keeping them clean and untarnished. Personally he had only had a slight experience of the use of silver and that was in the preparation of colloidal gold solutions. That was in 1913 when he used a silver still and found that if the still were left alone for a few days and not used, the distilled water obtained from it was quite useless for the preparation of colloidal gold. He then found that if, in these circumstances, a fairly saturated solution of sodium bicarbonate was poured through the still and the still was afterwards cleaned out, it was possible to obtain water of sufficient purity for the purpose of the colloidal gold solution.

Mr. C. Kesch (Financial Secretary to the India Office) said that although he was neither a chemist nor an engineer, his connection with silver impressed upon him the importance of extending the uses of it in industry. Was there, he asked, any reason why there should not be silver of varying qualities according to the purpose for which it was to be used?

### Silver Alloys

Mr. W. A. Newman (Royal Mint) said the author's suggestion of the growing importance of silver from the industrial point of view was borne out by the figures of output of the American Copper Co. which last year produced copper to the value of 11,000,000 dollars and silver to the same value. On the question of price it must not be overlooked that if, as the result of the paper, an extended use for silver was found in industry, then its production would be stimulated and the price would consequently go down. Indeed, the paper rather hinted that in time silver might cease to be regarded any longer as one of the precious metals. With regard to silver alloys, if the paper meant anything, it was that research into silver and silver alloys had not proceeded very far. Indeed, he believed that at the moment the equilibrium diagram was not very fixed and the basic principles of silver and silver alloys were even now somewhat in question. It might be that the addition of small quantities of other materials would materially improve the properties of silver, as had been found in the case of aluminium and other materials, and these could take the place of fine silver which the author had said was the best to use at the moment. A point in this connection was that in melting, the silver alloys were in contact with furnace gases which, in the majority of cases, were of a reducing nature, and although deoxidisation might be necessary, it might also be necessary to oxidise in some manner in order to get rid of the reducing gases which had been absorbed in the metal. The problem of corrosion was specially important from the point of view of chemical plant. Tarnishing was the first stage of corrosion, then followed corrosion and erosion, whilst there was also what had been termed serosion. Dr. Vernon, who had done considerable work on the atmospheric corrosion of various metals and alloys, had shown that a highly polished surface such as could be given to silver was necessary in order to reduce the amount of tarnish which takes place. Another interesting feature arising out of the work of Dr. Vernon was that silver which had been subjected to tobacco smoke resisted corrosion in a remarkable way and resisted a strong atmosphere of sulphuretted hydrogen for at least 24 hours afterwards. Colour was not so important in silver for chemical plant as for coinage, the silver for which had to be white to satisfy the æsthetic tastes of the people of this country. Therefore it was necessary for coinage purposes to comply with certain legal requirements which would not be in force in the case of chemical plant. The chief problem of the plant engineer appeared to be the corrosion problem, and that the vessels should have no poisonous effect upon the ingredients put into them, coupled with a sufficiently long life for the apparatus. All this suggested the need for further research and he felt that if chemical engineers could be induced to try out silver plant on a more extended scale, then research would quickly overtake the practical application of this type of plant.

Professor J. G. Lawn (President of the Institution of Mining and Metallurgy) speaking of prices, said there seemed plenty of scope for a fall even below the present level.

### Research and Construction

Dr. R. Seligman (President, Institute of Metals) disagreed with Mr. Newman's suggestion that research into the materials of which chemical plant is made must be behind the construction of such apparatus. He regarded that as heresy pure and simple. Research must precede construction, and if anybody attempted to use the customer as the dog to try things out on, it would not be doing either the customer or the manufacturer any good. Research must precede any development such as that which had been considered by the author, and it had been made clear that there was still much room for research. At the same time, considerable research was being carried out on silver, and no fewer than seven papers on the subject were to be presented at the annual meeting of the Institute of Metals very shortly. Silver was one of the newest metals to receive the attention of the chemical engineer. Reference was made in the paper to the use of silver in the construction of chemical plant for acetic acid and similar purposes, and in such cases it was necessary to be extremely careful for very small quantities of impurities in the acid might completely wreck a valuable piece of plant.

Mr. J. Arthur Reavell (President, Institution of Chemical Engineers) commented on the statement in the paper that the heat transmission properties of silver were superior to those of copper. Taking silver at 100, copper would be 91 and therefore it would be possible to use a smaller condenser of silver than of copper for the same work. At the same time, those who had been concerned with this knew that the amount of surface was ultimately determined by the gas or liquid coefficient, which was so low relatively that it made no difference whichever metal was used, and the size would be the same in both cases. Mr. Reavell then showed two slides of actual silver plant.

Dr. R. S. Hutton (Director, British Non-Ferrous Metals Research Association) called attention to the large amount of research work that has already been done in connection with silver which, he said, should make us all very keen on the value of concerted action in finding extended uses for the application of silver in industrial fields such as chemical plant.

Mr. E. Downs (Johnson, Matthey and Co., Ltd.) said his experience had not been so much with the use of silver as with its preparation. Oxygen was absorbed by silver in the course of manufacture and it was exceedingly difficult to get rid of. That was why he was of the opinion that all silver vessels for industrial purposes should be made by those who were acquainted with the methods of deoxidising silver. The second point was electrolytic action. With non-uniformly annealed silver, electrolytic action took place and that was very important where there were liquids in contact with the vessels the portions of which had been annealed differently. It was, therefore, highly important that such vessels should be made by people who were thoroughly conversant with modern methods of annealing.

Owing to lack of time, the author undertook to reply in writing. On the motion of Mr. J. Arthur Reavell, seconded by Mr. H. Talbot, a hearty vote of thanks was accorded him.

# British Overseas Chemical Trade in January

## Effects of Decline in Sulphate of Ammonia Values

THE Board of Trade returns of British overseas chemical trade for January show that the year has not opened too auspiciously. Imports during the month totalled £973,658, a decline of £285,403, compared with the corresponding month of 1930, exports at £1,707,446 were £465,385 lower and re-exports at £53,256 have dropped £13,281. It will be noted that the decline in quantities is not nearly so marked as that in values, and the falling price of sulphate of ammonia is responsible for a great deal of the lower exports figures.

### Imports

| | Quantities Month ended January 31. | | Value Month ended January 31. | |
|---|---|---|---|---|
| | 1930. | 1931. | 1930. | 1931. |
| CHEMICAL MANUFACTURES AND PRODUCTS— | | | | |
| Acetic anhydride ..cwt. | 60 | 214 | 182 | 758 |
| Acid, Acetic .....tons | 1,496 | 137 | 58,524 | 4,556 |
| Acid, Tartaric ....cwt. | 2,653 | 3,267 | 18,025 | 16,564 |
| Bleaching materials ,, | 13,210 | 3,977 | 13,230 | 9,336 |
| Borax..... ,, | 24,600 | 20,626 | 15,079 | 11,946 |
| Calcium carbide... ,, | 99,288 | 77,999 | 60,586 | 47,311 |
| Coal Tar Products value | — | — | 8,300 | 15,176 |
| Glycerine, Crude ..cwt. | 984 | 1,056 | 2,117 | 1,631 |
| Glycerine, Distilled ,, | 508 | 1,414 | 1,245 | 3,083 |
| Red Lead and Orange Lead .....cwt. | 4,000 | 2,112 | 6,881 | 2,997 |
| Nickel Oxide..... ,, | 96 | 100 | 449 | 580 |
| Potassium Nitrate (Saltpetre) .....cwt. | 14,353 | 6,469 | 14,285 | 5,784 |
| Other Potassium Compounds .....cwt. | 249,959 | 191,756 | 79,205 | 67,961 |
| Sodium Nitrate ... ,, | 142,767 | 118,192 | 64,103 | 51,830 |
| Other Sodium Compounds..... ,, | 39,723 | 31,586 | 28,071 | 19,563 |
| Tartar, Cream of.. ,, | 3,252 | 3,525 | 15,524 | 14,629 |
| Zinc Oxide .....tons | 1,014 | 670 | 29,411 | 16,745 |
| All other Sorts..value. | — | — | 278,015 | 222,657 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts .....oz. | 138,136 | 48,928 | 10,241 | 3,311 |
| Bark Cinchona (Bark Peruvian, etc.) ..cwt. | 2,018 | 228 | 9,265 | 533 |
| Other Sorts.....value | — | — | 104,358 | 131,037 |
| DYES AND DYE-STUFFS— | | | | |
| Intermediate Coal Tar Products.....cwt. | 109 | 25 | 1,323 | 391 |
| Alizarine ..... ,, | 24 | 28 | 737 | 999 |
| Indigo, Synthetic . ,, | — | — | — | — |
| Other Sorts..... ,, | 4,663 | 3,813 | 108,905 | 88,375 |
| EXTRACTS FOR DYEING— | | | | |
| Cutch .....cwt. | 2,895 | 2,689 | 4,999 | 4,945 |
| All Other Sorts .. ,, | 3,673 | 3,560 | 12,823 | 9,608 |
| Indigo, Natural .. ,, | 11 | 16 | 250 | 412 |
| Extracts for Tanning ,, | 81,205 | 82,529 | 78,933 | 76,892 |
| PAINTERS' COLOURS AND MATERIALS— | | | | |
| Barytes, Ground...cwt. | 49,747 | 35,946 | 10,980 | 7,168 |
| White Lead (dry) . ,, | 12,300 | 10,932 | 21,610 | 16,442 |
| All Other Sorts ... ,, | 98,692 | 99,271 | 141,405 | 120,438 |
| Total of Chemicals, Drugs, Dyes, and Colours.....value | — | — | 1,259,061 | 973,658 |

### Exports

| | | | | |
|---|---|---|---|---|
| CHEMICAL MANUFACTURES AND PRODUCTS— | | | | |
| Acid, Sulphuric ...cwt. | 16,635 | 2,255 | 5,145 | 2,426 |
| Acid, Tartaric .... ,, | 2,137 | 1,225 | 15,454 | 6,670 |
| Ammonium Chloride (Muriate) .....tons. | 389 | 352 | 6,746 | 5,991 |
| Ammonium Sulphate— | | | | |
| To Spain and Canaries tons | 29,812 | 12,846 | 258,902 | 89,918 |
| ,, Italy ..... ,, | 1,186 | 532 | 10,792 | 4,292 |
| ,, Dutch East Indies tons | 5,241 | 4,349 | 48,343 | 32,510 |
| ,, China (including Hong Kong) tons | 5,121 | 7,096 | 47,004 | 52,216 |
| ,, Japan ..... ,, | 10,488 | 5,065 | 94,950 | 36,479 |
| ,, British West India Islands and British Guiana tons | 894 | 664 | 8,038 | 4,656 |
| ,, Other Countries tons | 13,836 | 25,954 | 121,710 | 183,643 |
| Total.....cwt. | 66,578 | 56,506 | 589,739 | 404,714 |

| | Quantities Month ended January 31. | | Value Month ended January 31. | |
|---|---|---|---|---|
| | 1930. | 1931. | 1930. | 1931. |
| Bleaching Powder (Chloride of Lime) ...cwt. | 52,689 | 32,281 | 15,277 | 9,415 |
| COAL TAR PRODUCTS— | | | | |
| Anthracene .....cwt. | 5 | — | 3 | — |
| Benzol and Toluol galls. | 81,620 | 6,437 | 8,934 | 625 |
| | Cwt. | Galls. | | |
| Carbolic Acid (Crude) .. | 2,697 | 8,252 | 3,779 | 1,152 |
| | Cwt. | Cwt. | | |
| Carbolic Acid (Crystals). | 757 | 935 | 2,766 | 2,682 |
| | Galls. | Galls. | | |
| Cresylic aAcid..... | 138,685 | 115,674 | 17,568 | 12,362 |
| Naphtha.....galls. | 2,731 | 4,681 | 436 | 561 |
| Naphthalene (excluding Naphthalene Oil) cwt. | 11,848 | 9,756 | 3,735 | 2,538 |
| Tar Oil, Creosote Oil, etc. .....galls. | 470,627 | 2,503,168 | 12,405 | 59,234 |
| Other Sorts .....cwt. | 34,955 | 6,980 | 21,387 | 5,376 |
| Total.....value | — | — | 71,013 | 84,530 |
| Copper, Sulphate of cwt. | 3,296 | 2,320 | 78,452 | 44,987 |
| Disinfectants, Insecticides, etc. .....cwt. | 35,746 | 31,913 | 82,725 | 75,437 |
| Glycerine, Crude .... ,, | 2,798 | 5,543 | 6,229 | 8,262 |
| Glycerine, Distilled .. ,, | 7,769 | 2,896 | 20,063 | 6,743 |
| Total ..... ,, | 10,567 | 8,439 | 26,292 | 15,005 |
| POTASSIUM COMPOUNDS— | | | | |
| Chromate and Bi-chromate .....cwt. | 631 | 1,636 | 1,248 | 3,255 |
| Nitrate (Saltpetre). ,, | 939 | 777 | 1,817 | 1,330 |
| All Other Compounds cwt. | 3,521 | 6,746 | 11,573 | 9,891 |
| Total..... ,, | 5,091 | 9,159 | 14,638 | 14,476 |
| SODIUM COMPOUNDS— | | | | |
| Carbonate, including Soda Crystals, Soda Ash and Bi-carbonate cwt. | 376,448 | 375,223 | 103,750 | 97,297 |
| Caustic..... ,, | 191,524 | 161,965 | 122,229 | 105,597 |
| Chromate and Bi-chromate .....cwt. | 1,907 | 3,179 | 3,057 | 5,185 |
| Sulphate, including Salt Cake .....cwt. | 127,112 | 53,142 | 14,805 | 6,219 |
| All Other Sorts .. ,, | 58,381 | 39,044 | 82,197 | 61,003 |
| Total..... ,, | 755,372 | 632,553 | 326,038 | 275,291 |
| Zinc Oxide .....tons | 180 | 255 | 6,348 | 6,433 |
| Chemical Manufactures, etc., all Other Sorts value | — | — | 201,460 | 211,826 |
| Total of Chemical Manufactures and Products...value | — | — | 1,529,327 | 1,157,201 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts .....oz. | 138,995 | 83,348 | 13,753 | 8,928 |
| All Others Sorts...value | — | — | 258,928 | 222,768 |
| Total ..... ,, | — | — | 272,681 | 231,696 |
| DYES AND DYESTUFFS— | | | | |
| Products of Coal Tar cwt. | 7,605 | 10,848 | 56,639 | 81,202 |
| Other Sorts..... ,, | 7,556 | 6,200 | 7,809 | 5,326 |
| Total ..... ,, | 15,161 | 17,048 | 64,448 | 86,528 |
| PAINTERS' COLOURS AND MATERIALS— | | | | |
| Barytes, Ground ...cwt. | 1,990 | 139 | 837 | 68 |
| White Lead (Dry).. ,, | 2,225 | 2,358 | 4,579 | 4,362 |
| Paints and Colours in Paste Form.....cwt. | 39,070 | 31,175 | 77,095 | 56,744 |
| Paints and Enamels Prepared (including Ready Mixed)...cwt. | 41,100 | 32,936 | 131,060 | 104,271 |
| All Other Sorts .. ,, | 48,871 | 35,174 | 92,804 | 66,576 |
| Total ..... ,, | 133,256 | 101,782 | 306,375 | 232,021 |
| Total of Chemicals, Drugs, Dyes and Colours....value | — | — | 2,172,831 | 1,707,446 |

**Re-exports**

| | Quantities Month ended January 31, 1930. | Quantities Month ended January 31, 1931. | Value Month ended January 31, 1930. | Value Month ended January 31, 1931. |
|---|---|---|---|---|
| CHEMICAL MANUFACTURES AND PRODUCTS— | | | | |
| Acid, Tartaric ....cwt. | 95 | 158 | 740 | 827 |
| Borax..... ,, | 1,657 | 1,215 | 1,571 | 613 |
| Coal tar products .value | — | — | 19 | — |
| Potassium nitrate (saltpetre) .....cwt. | 2,059 | 106 | 1,838 | 176 |
| Sodium nitrate.... ,, | 229 | 22 | 115 | 16 |
| Tartar, cream of . ,, | 327 | 247 | 1,316 | 1,237 |
| All other sorts.....value | — | — | 14,707 | 9,322 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts .....oz. | 14,902 | 12,836 | 1,316 | 1,238 |
| Bark Cinchona (bark Peruvian, etc. ....cwt. | 149 | 176 | 878 | 1,015 |
| All other sorts....value | — | — | 34,804 | 31,115 |
| DYES AND DYE-STUFFS— | | | | |
| Extracts for dyeing— | | | | |
| Cutch .....cwt. | 970 | 767 | 1,489 | 1,241 |
| All other sorts .. ,, | 127 | 96 | 1,446 | 454 |
| Indigo, natural ... ,, | — | 4 | — | 96 |
| Extracts for tanning ,, | 762 | 2,290 | 1,036 | 2,536 |
| PAINTERS' COLOURS AND MATERIALS .....cwt. | 2,793 | 1,113 | 5,048 | 2,939 |
| Total of Chemicals, Drugs, Dyes and Colours....value | — | — | 66,537 | 53,256 |

## The Bolton Laboratory Tragedy

### Chemist and Assistant Overcome by Cyanide Fumes

THE resumed inquest into the death of Mr. James Haig Campbell (67), an analytical chemist, of Tong Moor, Bolton, and his assistant, Leslie Tootill (21), of Bradshaw, Bolton, who were found overcome by chemical fumes at Mr. Campbell's laboratory at Court Chambers, Mawdsley Street, Bolton, on the night of February 9 last, was held on Wednesday at Bolton Infirmary. It was established that their deaths were due to their having inadvertently inhaled cyanide fumes, and the jury returned verdicts of "Accidental death."

Evidence was given of finding Mr. Campbell and his assistant unconscious in Mr. Campbell's offices about 8.30 p.m., and Mr. Harry Hurst, the Borough Analyst, said that the cause of death in both cases was cyanide. Although, he added, there was no necessity to use cyanide in connection with an experiment which Campbell appeared to be conducting at the time, there was nothing extraordinary in cyanide being on the premises.

The Coroner said there was no reason to think otherwise than that the tragedy was caused by an accident.

### Chemistry at Birmingham University

THE Joint Standing Committee for Research at Birmingham University, in a report to the Court of Governors at their meeting on Thursday stated that grants have been made to the Department of Chemistry for the following researches: Determination of the ring structure in the sugar group; the study of the problems of polymerisation; the constitution and mode of occurrence in nature of di- and tri-saccharides; researches on the chemical behaviour and structure of polysaccharides; and X-ray investigations on the structure of carbohydrates.

Mrs. P. F. Frankland had presented a bronze relief portrait of Emeritus Professor P. F. Frankland (formerly Professor of Chemistry at the University) to be placed in the Chemistry Department. Donations had been received from the following, for research in the Department of Oil Engineering and Refining: The Distillers Co., Ltd., £350; the Anglo-Persian Oil Co., Ltd., £100; and the Institution of Automobile Engineers, £100.

The Chance Education Trust have founded an entrance scholarship at the University to be known as the "Roger Chance Scholarship." It is of the annual value of £50, tenable for three years, and is restricted to candidates of Smethwick, West Bromwich and Oldbury. Preference is to be given to the children or more remote descendants of employees or ex-employees of Chance Bros. and Co., Ltd., glass manufacturers, Smethwick.

## How the Chemist Helps the Farmer

### Making Grass Grow Earlier

ONE of the most interesting examples of the application of science to agricultural methods is the intensification of grassland farming. This is gradually bringing about something of a revolution in British agriculture, since the realisation of its value has coincided with the great turnover from agriculture proper to grass. The arable acreage in Great Britain between 1918 and 1930 decreased by over 2½ million acres. Actually the year 1929/30 saw a decrease of no less than 114 thousand acres in England and Wales and about 19 thousand in Scotland.

Experiments have now been carried out at the I.C.I. agricultural research station at Jealott's Hill which show that an enormous saving in labour and expense can be effected by treating grass-growing scientifically. The grass must be so treated that it starts to grow earlier in the year. Normally growth starts in May, but by the application of nitrogenous fertilisers it is possible to start a healthy natural growth by March. The saving to the farmer by this early grass is estimated at no less than £2 per head in cattle feeding costs between April and October. Proof of the value of the practice is found in the increase of acres of grass under intensive cultivation. The acreage in England and Scotland has increased from a mere 75 acres in 1926, 925 in 1927, 27,000 in 1928, 61,000 in 1929, to nearly 200,000 in 1930.

Some of the fertilisers used, more particularly sulphate of ammonia, are made synthetically, the raw materials being coal, water, air and calcium sulphate. Such progress has been made with the bulk production of these fertilisers at Billingham and elsewhere, that they have been brought well within the means of the smallest farmer and even of the smallholder.

### American Asphalt Companies' Claim

MR. JUSTICE ROCHE, in the King's Bench Division on Wednesday, concluded the hearing of the action in which the General Asphalt Co. and the Barber Asphalt Co., American corporations, sued the Anglo-Saxon Petroleum Co., Ltd., for damages for breach of contract.

It was alleged that defendants had failed to use their rights and influence to secure for plaintiffs from the Colon Development Co., Ltd., 9⅜ per cent. royalty of the crude oil produced from the properties in the Vigas concession, Venezuela, in the neighbourhood of the famous Lake Marakaibo oilfields.

Defendants replied that they were to use their influence as far as legitimately possible, and they could not out-vote minorities in subsidiary companies. They had carried out the obligations of an agreement of 1923, under which they were sued. They counter-claimed a declaration that they were not bound to secure delivery of the royalty oil.

Mr. Justice Roche, giving judgment, said he had to consider only the construction of the agreement, and nothing else, at this stage. Large sums of money were involved. He held that defendants had broken the agreement, and plaintiffs were entitled to damages. There would be judgment for plaintiffs on both the claim and counterclaim, each side to pay their own costs.

Leave to appeal was given.

### Manufacturing Chemists Fined

THREE summonses under the Dangerous Drugs Act were heard at Manchester on Wednesday. It was alleged that the Wynost Manufacturing Co., Ltd., chemists, of Oxford Road, had in two cases failed to keep a record of the supply of cocaine hydrochloride, and, in a third case, had failed to register a supply of a preparation containing cocaine.

Mr. Hutton, prosecuting, said that he had been instructed by the Secretary of State to call attention to the fact that nearly 300 grains of cocaine, supplied, as it was alleged, to the company, remained unaccounted for. That amount of the drug would kill a great many people.

A police officer said that when he visited premises in Oxford Road he was informed that a former manager, who was a qualified chemist and entirely responsible for the handling of the drugs, had disappeared since the first week in December.

A fine of £25 in each of the three cases was imposed, together with five guineas costs.

# The British Exhibition at Buenos Aires

## Better Business Predicted for 1931

**(From Our Special Correspondent)**

*We publish below the first of a series of letters from Mr. John Benn, who is now on his way to the Buenos Aires British Trade Exhibition to be opened in March by the Prince of Wales, and who has arranged for a tour of 20,000 miles as the representative of Benn Brothers, Ltd.*

AFTER the inevitable rush preceding a three months' tour, a few days at sea have provided a welcome opportunity to review the plans and prospects for the Buenos Aires Exhibition. Benn Brothers, Ltd., are proud of their claim to be the leading trade publishers in Britain, and I find that the list of exhibitors includes 330 firms with whom THE CHEMICAL AGE and its associated publications already do business. That is to say, more than a third of the firms who will take part in this important enterprise, representing all branches of British industry, use the Benn journals for their publicity, recognising the trade press as the most powerful weapon available for developing their business. At the start of a tour that will cover 20,000 miles, it is satisfactory to know that so many firms are interested in its object, and should benefit from the survey of the South American markets which I hope to provide for readers of THE CHEMICAL AGE.

If there were originally any doubts as to the success of the Exhibition, the response of British manufacturers has completely dispelled them. Many of the exhibitors will make their first appearance in South America and are going there primarily to explore the ground. A notable feature is the number of small firms in the list, who have rallied to the Prince of Wales's lead and are out to capture a share of this trade. The opportunities are probably greater than some of them realise, since a chief requirement of success is specialisation. The wide range of articles required for European or Dominion export is not so necessary in South America, which is essentially a "single article" market. The manufacturer has first to discover what sells best and then to concentrate on the production of this particular line.

Here is the small manufacturer's chance, since his bigger rivals are to some extent handicapped by the selection they must produce for world-wide sale. Cheapness, moreover, is not always the governing factor, as in many lines the recognised quality of British goods guarantees a ready market, provided the style is suited to the taste of South American buyers.

### Preference for British Goods

The Buenos Aires Exhibition will make history as the first national industrial exhibition organised by any country in South America. The lead appropriately comes from Britain, with which Argentina has long had the closest business relations. At the present time British capital invested in the Republic totals up to many millions. For some years past the imports into Argentina from the United States have exceeded those from the United Kingdom, but the figures just published for the first nine months of 1930—a period of considerable depression—show a fall of 37·8 per cent. in the American imports, whereas the English total declined by only 13·4 per cent.

The fact that Argentina relies so largely on Britain for the disposal of her primary products no doubt accounts for part of this preference, but our goods are favoured whenever they compete in price with other foreign products. The two countries have a great deal in common. The value of exports per head of the population in a typical year is nearly the same, and Argentina buys much of her machinery from London. The wealth of the Republic is divided between agricultural, pastoral, and industrial interests, each accounting for about a third of the country's annual output.

Apart from the stimulus that the Exhibition will afford to trade and industry, it is believed that political influences will continue to work for improved confidence. The new Government is more in tune with public opinion than the previous administration, and is supported alike by agricultural, pastoral and financial interests. So strong was the feeling of optimism aroused by the change that the banks at once placed a loan of several millions at the disposal of the provisional Government. With normal climatic conditions, a very large wheat crop will be harvested this summer, and should further improve the country's trading position.

I understand that the satisfaction of the trade agreement negotiated by the d'Abernon Commission is likely to be announced while the Exhibition is in progress. The principal clause provides that the British and Argentine Governments shall open mutual credits to an amount on either side of approximately £8,000,000, for a period of two years from the date of operation. It will be remembered that the Argentine Senate had not yet ratified the agreement when the revolution broke out. There are hopes that the new administration will hasten a decision, which will be welcome to our heavy industries, as the credit is to be used in buying British materials for the State Railways and other departments.

### Advice on Trading Methods

The first week at sea has enabled me to study the new official report on "Economic Conditions in the Argentine Republic" (H.M. Stationery Office), which deserves the closest attention this year in view of the Exhibition. The author is Mr. H. O. Chalkley, Commercial Counsellor to the British Embassy at Buenos Aires and he gives much valuable advice on trading methods and prospects.

Perhaps the most encouraging aspect of Mr. Chalkley's report is the evidence it affords of British prestige in Argentina. Scattered through its pages I find isolated paragraphs worded with our customary modesty, which, read together, form a remarkable tribute to the strength of our position. British investments have been supported by administrative work of the highest value. Especially is this the case in engineering. Our engineers are responsible for a big share in the opening up of the country and have introduced British technical standards on a wide scale. In 1928 a centre of British Engineering and Transport Institutes was founded at Buenos Aires to provide a permanent headquarters for the professional societies in the city, and an extensive library now provides current British journals for the use of its 800 members.

When the Argentine Government recently required an investigation into a national scheme connected with the grain trade they called in a British firm to study the question and to report on its technical aspects. State action has not so far materialised, but developments are anticipated shortly in installing grain elevators at the ports to replace the present system of transport in bags. Here is an opening for British agricultural machinery which ought to provide big orders in view of the favoured status of our engineers in this important matter.

The railways also are providing further orders for British workshops. Over 16 000 miles of railway line are owned by British companies in Argentina—more than two-thirds of the country's entire system—and last year new extensions of over 200 miles were opened for service. All the materials used were of British origin and big orders are also in hand for new rolling stock. The strength of the British engineering profession provides an exceptional asset to the firms taking part in the Exhibition and will afford most favourable openings for their directors to make technical contracts with local engineering in all its branches. Excursions are being arranged by the Institutes for the benefit of the visitors, and I am keenly looking forward to seeing some of the big plants in operation at Buenos Aires.

John A. Benn

# Chemical Trade of Argentina

## British Movement for Expansion

In Mr. Chalkley's report on "Economic Conditions in the Argentine Republic," mentioned in Mr. John Benn's letter, reference is made to the chemical trade of the country and statistics are published of the chemical imports.

### Drugs, etc.

There is a total import trade in drugs and patent medicines of about 5,000,000 gold pesos per annum. During the year under review trade has been quiet, especially between May and August. French and German manufacturers supply the greater part of the imports. Owing to the exchange depreciation being proportionately more adverse to British sellers, some importers have bought products from the continent to replace the more expensive British brands in certain lines. Prospects depend on improvement in the general economic position, but competition with German and French prices will remain. The Argentine is a most receptive market for patent medicines and toilet preparations, and almost any brand can be sold by extensive advertising. Stricter regulations have been introduced by the Customs authorities to prevent the importation of substitutes for pharmaceutical products approved by the Health Department. Importers will in all cases be required to declare the quality, brand, name, and manufacturer of these products.

### Sheep Dips

Competition in sheep dips has increased during the past year, mainly among British manufacturers themselves, owing to greater activity on the part of several new brands of British origin which entered the market some two years ago. A large German chemical concern has also been conducting trials and announces that it intends competing for a share of this trade, but so far it does not appear to have gone beyond the experimental stage. Owing to the drought last year consumption has been less, both by reason of mortality in the flocks and less scab, which always follows a dry period. Although climatic conditions are now more favourable the outlook is anything but good, owing to the depressed value of the farmers' produce, which tends to restrict consumption. Loss on exchange is also prejudicing the importers, and although prices have not yet been raised there is every probability that this will have to be faced.

### Russian Activity

The trade in industrial chemicals has been affected during the year by the re-entry of Russia into the market with supplies at very low prices. In spite of this competition and the general depression the British share of the business has been maintained better than was to have been expected. The sulphuric acid contact plant mentioned last year as being established in Buenos Aires by local and British interests started operations in March, 1930. None of the proposed tartaric-acid factory schemes has so far materialised, and no new manufacturing developments have taken place.

### Paints and Varnishes

The sale of paints and varnishes during 1930 was affected by the general depression and to a certain extent by the painters' strike. Under these conditions the sale of high class paints, such as those of British origin, is restricted by the existing desire for strict economy and the increased preference for the cheaper article. British manufacturers of water paints have maintained their usual share of the trade in spite of the existing depression. A good demand has been created for American nitro-cellulose paints which are now being employed considerably, especially for the painting of motor-cars. The local manufacture of paints, varnishes, and enamels is gradually improving in quality, and most manufacturers have improved their plants. In some cases the most modern and up to date plant has been installed. In so far as price only is concerned, British manufacturers are hardly in a position to compete. One of the most serious obstacles encountered in selling paints in the Argentine market is the lack of technical workmen. Most painters are non-technical, and in Europe would be classified in the category of painters' labourers. With few exceptions they know little of quality and the efficiency of a paint, and buy the cheapest products available, with the result that the demand for high quality paints and varnishes is limited to better class work where expert painters are employed.

CHEMICAL IMPORTS.

| | 1928 | 1929 |
|---|---|---|
| | Kilos. | |
| Tartaric acid | 1,427,692 | 1,936,560 |
| Italy | 889,583 | 1,256,026 |
| Germany | 420,038 | 506,237 |
| Citric acid | 344,011 | 257,323 |
| Italy | 290,795 | 200,173 |
| United Kingdom | 21,243 | 43,562 |
| Sulphate of aluminium | 3,301,661 | 4,009,969 |
| Germany | 1,955,813 | 1,243,524 |
| Sweden | 916,091 | 1,562,000 |
| United Kingdom | 120,322 | 265,162 |
| Ammonium chloride | 955,802 | 802,247 |
| Germany | 763,495 | 715,744 |
| United Kingdom | 105,345 | 71,552 |
| Ammonia, anhydrous | 688,065 | 1,033,410 |
| United States | 452,879 | 624,869 |
| Germany | 224,133 | 268,602 |
| United Kingdom | 8,163 | 136,689 |
| Calcium carbide | 6,704,398 | 6,858,220 |
| Sweden | 3,379,899 | 3,011,589 |
| Norway | 2,172,678 | 1,665,619 |
| France | 479,856 | 301,807 |
| Italy | 97,269 | 1,050,279 |
| Copper sulphate | 3,777,595 | 2,049,307 |
| United States | 1,889,011 | 1,033,537 |
| United Kingdom | 967,953 | 813,374 |
| Sheep dips | 11,155,085 | 11,301,842 |
| United Kingdom | 9,494,864 | 9,690,941 |
| United States | 1,091,207 | 1,184,603 |
| Caustic soda | 12,454,243 | 13,016,079 |
| United States | 4,324,489 | 5,432,993 |
| United Kingdom | 7,235,239 | 6,754,036 |
| Sodium carbonate | 24,561,945 | 27,409,420 |
| United Kingdom | 19,526,859 | 19,871,422 |
| Japan | 3,157,068 | 4,670,791 |
| United States | 679,884 | 1,038,703 |
| Germany | 781,244 | 943,548 |
| Sodium nitrate | 3,572,339 | 838,002 |
| Belgium | 102,750 | 441,096 |
| Germany | 172,007 | 201,945 |
| Chile | 3,159,506 | 56,096 |
| Sodium silicate | 7,852,456 | 10,865,069 |
| United Kingdom | 3,818,454 | 5,443,195 |
| Germany | 3,052,554 | 3,840,834 |
| Belgium | 176,465 | 1,121,535 |
| Aniline dyes | 445,812 | 556,942 |
| Germany | 250,864 | 257,864 |
| United States | 113,113 | 210,063 |
| Switzerland | 60,870 | 68,767 |
| Ultramarine | 1,679,075 | 1,381,567 |
| United Kingdom | 1,132,249 | 919,911 |
| Belgium | 187,578 | 128,233 |
| Other colours in lumps or powder | 298,639 | 371,449 |
| Germany | 134,039 | 137,179 |
| United Kingdom | 92,795 | 74,158 |
| White lead | 242,389 | 266,898 |
| United Kingdom | 139,000 | 190,128 |
| United States | 30,792 | 11,608 |
| France | — | 25,790 |
| Paints in paste | 4,068,000 | 3,193,510 |
| United Kingdom | 2,849,695 | 2,263,994 |
| United States | 561,832 | 546,649 |
| Netherlands | 369,637 | 183,131 |
| Paints, liquid (enamels) | 1,617,662 | 1,506,296 |
| United States | 922,336 | 919,498 |
| United Kingdom | 391,284 | 313,044 |
| Germany | 83,679 | 100,238 |
| Paints—liquid in general | 1,100,438 | 1,242,874 |
| United Kingdom | 696,777 | 556,777 |
| United States | 301,404 | 575,550 |
| Varnishes | 1,084,534 | 835,978 |
| United States | 447,987 | 373,042 |
| United Kingdom | 484,394 | 333,455 |
| Turpentine | 1,576,270 | 1,615,747 |
| United States | 1,427,907 | 1,506,841 |
| United Kingdom | 94,586 | 55,666 |

# Indian Chemical Notes

(By Our Indian Correspondent.)

### Sir C. V. Raman

India naturally feels proud of Sir C. V. Raman, the Nobel Prize winner for scientific researches. He is known for the discovery of the "Raman effect," which was first discovered in February, 1928, and announced in a paper read by him before the South Indian Scientific Association, Bangalore. For this he had to go through a series of brilliant investigations. Sir C. Raman illuminated a certain quantity of benzene placed in a flask by means of light from a very powerful mercury vapour lamp of three thousand candle-power which emits monochromatic light. The light, scattered in a direction at right angles to the direction of the beam, was then studied. A photograph of the scattered light showed that in addition to the colour contained in the original light from the mercury lamp, new colours were, as it were, manufactured by the benzene molecules.

### The Explanation

Sir C. Raman explained this phenomenon as follows:—"The packet of energy colliding with the molecule mostly gives up a part of its energy to the molecule which is excited, and the remainder is exhibited as a modified colour." Sometimes a more curious phenomenon happens. If the packet of energy comes in collision with an already excited molecule, the light quantum, as it is called, instead of losing anything, relieves the molecule of its extra energy. This phenomenon is exhibited by almost all the molecules, and has thus proved a powerful instrument for the investigation of the inner structure of the molecules. Thus the "Raman effect" has opened up a very prolific and vast field of research.

### Calcutta's New Test House

The Test House at Alipore, in Calcutta, maintained by Government, has now been equipped with a new test room with the latest instruments for testing the characteristics of ceiling fans. Other new apparatus installed include a colorimeter for matching and standardising colours, a machine for cutting and testing the durability of workshop files and a testing transformer for testing insulating materials at voltages up to 90,000. Among the other testing appliances recently installed is a cement laboratory. The Test House thus renders valuable service to the Indian manufacturer not only by recommending the purchase of his products by the Stores Department when quality and price are favourable, but by showing the unsuccessful manufacturer the steps to be taken to improve their quality.

### Trade in Chemicals

The six months' trade in India from April to September showing only a slight reduction in the imports of chemicals into India, illustrates clearly that the boycott agitation has not affected these imports. The value amounted to Rs.134 lakhs, as against Rs.142 lakhs in the same period of the previous year. The imports of acids showed an actual increase. There were also increases in bleaching powder and some other minor products. But sodium compounds, potassium compounds, magnesium compounds, zinc compounds and sulphur showed decreases, the last especially declining heavily. There was a decline in the imports of drugs and medicines, the value of which amounted to Rs.82 lakhs, as against Rs.102 lakhs in the same period of the previous year. The chief decline was in quinine salts and patent medicines.

### Imports into Sind

Imports into Sind under chemicals, drugs and medicines in 1929-30 showed a marked recovery, the value increasing by Rs.7 lakhs to Rs.49 lakhs., which is the highest level reached for five years. The improvement was due chiefly to larger imports of caustic soda, soda ash, and medicines from the United Kingdom. The imports of artificial silk declined in value from Rs.48 lakhs to Rs.24 lakhs, mainly owing to reduced purchases of piece goods of cotton and artificial silk from Italy, United Kingdom and Germany. Imports of dyes and colours were valued at Rs.26 lakhs, a decrease of about Rs.2 lakhs, which was most noticeable in the supplies of aniline dyes from the Netherlands—the result of overstocked markets. Imports of paper and pasteboard amounted to Rs.40 lakhs. There was also a notable expansion in the trade in rubber manufactures, but the value of glassware and earthenware declined from Rs.23 lkhs to Rs.18 lakhs.

### Artificial Silk

The imports of artificial silk recorded a decline from Rs.190 lakhs to Rs.134 lakhs. The imports of yarn amounted to 2·6 million lb., as compared with 3·8 million lb. Imports from all countries declined, Italy's share going down from 1·9 million lb. to 1·4 million lb. The imports of mixed piece goods showed some improvement in quantity from 21 million yards to 25 million yards, but declined in value from Rs.129 lakhs to Rs.115 lakhs. This decline in value was principally due to the very low rates at which Japan dumped her goods on the Indian market, increasing her share from 6 million yards to 15 million yards. The United Kingdom's share fell from 3·9 million yards to 1·8 million yards, and Italy's share from 6·2 to 3·8 million yards.

### Manufacturing Printer's Ink

Some very successful experiments have recently been made in Madras in the laboratory of the Industries Department for the manufacture of printer's ink. The presses which tested the sample inks have expressed satisfaction with their quality. The most important item of work was the manufacture of ink for rotary processes, which has also given satisfaction. The commercial possibilities are under investigation.

### Investigation into Imports

The Government of Bombay carried out an inquiry through the Industries Department into the imports of chemicals from abroad and their manufacture in India. No less than fifteen items were included in the inquiry, of which heavy chemicals, fine chemicals, chemical fertilisers, coal tar products, dyestuffs, artficial silk, paper pulp, tanning materials, and glass were the most important. About ten crores of rupees' worth of these products are annually imported into Bombay. India is now very largely self-contained in the matter of supply of sulphuric acid, but the price at which it is available is very high. Soda ash is imported and its price is also relatively high in India. The high prices of these basic materials adversely affects the establishment of the majority of other chemical industries.

### Manufacture Possible

The investigations carried out by the Department has revealed many possibilities even as regards fine chemicals and their products, which are generally required in very small quantities in India. An example is that of a factory which has been recently established in Bombay to manufacture formaldehyde, the entire output of which is being purchased by a big European firm of importers of chemicals. Similarly, in regard to the manufacture of soda ash, after working out the manufacturing cost at great length, the Department of Industries has come to the conclusion that this can be manufactured at competitive prices. The whole subject is a difficult one and highly technical, and the Department considers it essential that the problem of manufacture of chemicals in India should be very carefully considered on an all-India basis.

### Inquiries in Progress

At the request of the Excise Department, the Department of Industries considered the question of utilisation of spent Mhowra flowers for the manufacture of paper pulp. The Excise Department has been in touch with a paper mill which had agreed to try out the experiment on a commercial scale, and the Industries Department has devised a press which can be made locally at a moderate cost. Similarly, the Forest Department wanted to know if refined china clay for textile industiy can be prepared from the raw china clay found at Castle Rock in the Presidency, and the investigation is now in progress.

### Wood Distillation in Mysore

Wood distillation is carried on in the Mysore State in connection with the State ironworks. The "Dewan," in reviewing the working of these works, stated that the market for lime acetate was considerably disturbed in November, 1929, by financial troubles in America, and the position had since been rendered worse by the competition of synthetic acetic acid. The value of all kinds of stocks have had to be written down, and it is difficult to say how long the present slump in the wood distillation and iron industries would continue. Serious attempts are, however, being made by the State in various directions to secure at least an equilibrium between operation outlay and outturn even at the current low prices. Financial conditions are under special examination.

# The Chemist and the Student

## Relations in Oil and Colour Industry

A JOINT meeting of the Oil and Colour Chemists' Association and the Borough Polytechnic Oil and Colour Students' Association was held in the Council Chamber of the Institute of Chemistry, London, on Thursday, February 12, when a discussion took place on the relations between the chemist and the student. Mr. W. Noel Heaton (President of the Oil and Colour Chemists' Association) was in the chair.

Mr. G. C. Geddes, who opened the discussion on behalf of the Students' Association, said students might be placed in two categories :—(1) Those who obtained a comparatively complete preliminary knowledge of what were termed the pure sciences—*i.e.*, those who were able to take a university or similar training before entering industry ; and (2) those who were compelled to enter industry without this fundamental training, and had to acquire knowledge as best they could. The majority of students entering the paint or allied industries were confronted by many complex branches of specialised technology which were liable to produce a most bewildering effect. Generally, the student considered one, or perhaps two, branches and settled down to study these, together with chemistry, with the result that by the time he had acquired an appreciable knowledge of these subjects, more or less to the exclusion of others, he found he was by way of becoming a specialist. Should he continue with these latter subjects it was possible that he would exhibit a tendency to develop a narrowness of outlook which, at times, might be fatal to the chemist or technologist. In Mr. Geddes' opinion, the student should endeavour to arrange a course of study which would consist firstly of an elementary survey of the principal branches of applied technology—an introduction to what might be termed the pure sciences—so that he might be more or less familiar with the technical factors connected with those everyday problems with which he might be brought into contact. He should then, and not till then, make a specialised study of those branches of technology and pure science with which, according to his particular profession, he was more especially concerned. It would be appreciated, that in order to produce mutual satisfaction, it was the duty of the chemist to give advice to all students who might be placed in his care. This would assist the avoidance of those incoherent courses of study which were sometimes pursued by misguided, or rather unguided, students.

### Chemists and Technologists

Mr. T. M. Tyson (representing the Oil and Colour Chemists' Association) defined a chemist as one who had pursued his studies for years and had obtained his degree. In many laboratories there were some very clever men, styled "chemists," who had not obtained degrees, but it would clear up much misapprehension if such men were styled "technologists" in their particular subjects. He personally did not regard the training of chemists as being the real function of the Borough Polytechnic, particularly in the oil and colour section. The classes there provided opportunities for various studies, for specialising in oils, paints, varnishes, and so on, and if a chemist wishes to improve his technical knowledge of on particular subject, the Borough Polytechnic would welcome him with open arms. There were far too many foremen whose whole knowledge had been gained in the bitter school of practical experience, and who were guided only by rule-of-thumb. On the other hand, there were too many people holding the B.Sc. qualifications who were only too thankful to accept a post at a salary of £3 per week. This was not as it should be. There were many people, products of technical schools, who blithely called themselves chemists and hoped for the best—they had a knowledge of one subject only—and they were simply leeches on the backs of the fully qualified chemists.

Mr. A. M. Roach said when one came into contact with varnish and paint materials generally, one was up against subjects which were never touched, so far as he knew, in an ordinary university course. The Borough Polytechnic courses could be very useful in such a case, because there one came into contact with people who knew and could explain the actual problems in the industry.

Mr. R. G. Browning urged that during his first three months in the works the student must not expect to do anything beyond learning something about the materials handled there, the manner in which they were combined or mixed, and the theories of the processes and reactions ; he should also try to attain some proficiency in the use of machines and tools, bearing in mind that he would be respected much more highly by the workmen if he could do so.

Mr. A. W. C. Harrison said it should be remembered that when a student had completed his college training he had still to undergo practical training in industry, so that the reward for his service when he first entered industry could be regarded partly as payment in cash and partly in payment in kind, *i.e.*, experience.

Mr. S. G. Clifford was critical of the trade unions for making very little effort in the direction of technical education, and said it appeared that one must look for the bright young men among the non-union sections of the workers. Trade unions were very excellent organisations in their place, but he did feel that they did not assist very much the picking out of promising young men and encouraging them to try to do something better.

### The True Value of Training

Mr. T. Hedley Barry urged that technical education should be regarded rather more from the philosophical than the utilitarian point of view. The studies involved in obtaining a degree, he said, were just the preliminaries before starting one's real work ; therefore, to discuss what a chemist received by way of salary when he entered industry was rather irrelevant. The value of training was invariably greater if a man looked at it with the idea of getting an intelligent knowledge of his industry than if he regarded it merely as a means of obtaining a better job. If the colleges endeavoured to teach men that life was worth living for its own sake, and that their jobs were worth doing for their own sakes, instead of offering courses to enable them to get better jobs, we should all be more contented and antagonism between the scientific and technical men would be dropped.

Mr. G. Copping pointed out that students attended polytechnic classes because they wanted to, and not because they were told that they should. They were ready to take opportunities, and if the chemist would refrain from bothering about the possibility of a younger man taking his job in the future, but would give the younger man a little help, a great advance would be made.

Mr. L. A. Jordan (Director, Research Association of British Paint, Colour and Varnish Manufacturers) said that any self-respecting man would help any young person, because, after all, in our saner moments we all realised that it was the continuity of the race and the sequence of things that mattered. It was the catholic type of education that really made one a man of affairs. He had studied every natural science in one form or another, with the exception of the biological sciences, and there had been many occasions since when he had been thankful that he had known something about them.

Mr. D. Wait (President of the Borough Oil and Colour Students' Association) urged the importance of learning a little chemistry before taking technical courses. He commented with pleasure on the fact that the trade was carrying out more research than formerly, and said the authorities at the Borough Polytechnic had instituted a research class, and the City and Guilds Institute would probably also include research in its curriculum. As to the attitude of trades unions, the Joint Industrial Councils were taking more interest in technical matters than formerly, and he believed they were going to make a special effort during the next session to persuade their members to attend technical classes.

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## Arts Competition in Industrial Designs

PARTICULARS of the eighth annual open competition of industrial designs, to be held at the Imperial Institute, South Kensington, London, in June, 1931, have been issued, and can be obtained from the Secretary of the Royal Society of Arts, John Street, Adelphi, London, W.C.2. Intending competitors must apply to the Secretary of the Society between May 1 and May 9 for the necessary entry forms, the last day for receiving entries being May 22. The designs will be received at the Imperial College of Science and Technology, Imperial Institute Road, S.W.7, between June 8 and 10. In all, scholarships and prizes amounting to about £1,600 are offered.

# From Week to Week

INCORPORATED on February 22, 1906, Barimar, Ltd. (welding engineers), this week commemorate their 25th birthday.

¶ SIR HUGH BELL has been appointed chairman of Dorman, Long and Co., Ltd., in succession to the late Sir Arthur Dorman.

THE FARRAR BOILERWORKS, LTD., announce that they have recently appointed G. W. Risdon and Co., 11, Victoria Street, Westminster, to represent them in the London area.

MR. GEORGE F. YUILL, a director of W. P. Naismith and Co., Ltd., manufacturing chemists, Bridgeton, Glasgow, has been appointed chief flying instructor to the flying school of the Northern Air Transport, Manchester, and deputy-manager of Manchester Municipal Air Port at Borton Moss.

MRS. MARTHA ELLEN DAWE, Bargoed, the widow of a fitter who was employed at the Bargoed By-Product Works of the Powell Duffryn Co., was awarded £479 compensation by Judge L. C. Thomas at Bargoed County Court last week. It was claimed for the widow that her husband had died as the result of poisoning at the by-product works.

THE MARKET for paints, varnishes, etc., in Peru is the subject of a confidential report prepared by the Department of Overseas Trade from information furnished by the Commercial Secretary to H.M. Legation at Lima. Firms desirous of receiving a copy should communicate with the Department at 35, Old Queen Street, London, quoting Reference No. B.X. 7,009.

A HOLIDAY COURSE of chemistry lectures will be delivered at the University of Leeds on April 15, 16 and 17 next. The lecturers will be Mr. J. W. Baker, on the electronic theory of valency; Mr. F. L. Usher, on recent developments in colloid chemistry; and Professor H. M. Dawson, on the ionisation of electrolytes and on acids and bases. The fee for the course will be £1, and applications for admission should be sent as soon as possible to the Registrar, Leeds University.

A REVISED BOOKLET on the regulations for the purchase, use and sale of methylated spirits and methylated finish, has just been issued by the Methylating Co., Ltd., Chancellor's Road, Hammersmith, London. It includes the new regulations which came into force on January 1 this year and gives in concise form full information regarding the method of obtaining industrial, pyridinised and mineralised methylated spirits, as well as reproductions of the forms that have to be filled in.

PROFESSOR W. P. WYNNE, Professor of Chemistry in Sheffield University since 1904 and Dean of the Faculty of Science, is retiring in June. From 1888–1890 he was lecturer in chemistry at the City and Guilds of London Institute's Central Technical College and later Assistant Professor of Chemistry at the Royal College of Science and Professor of Chemistry at the Pharmaceutical Society's School of Pharmacy. He has twice been secretary of the Chemical Society, and was president from 1923 to 1925. In 1913, he was president of the Chemistry Section of the British Association.

MR. BRYNMOR THOMAS, Advisory Chemist at Armstrong College, Newcastle, gave a lecture recently to the Matfen branch of the National Farmers' Union on "The Agricultural Chemist and the Farmer." No other profession, he said, had done as much as chemistry to further the cause of agricultural science. Quite apart from the benefits conferred upon farmers by research and industrial chemists, the advisory agricultural chemists employed under the Ministry of Agriculture's Scheme were able to render very material assistance in the solution of everyday farming problems.

A LETTER has been sent to the Prime Minister by the Federation of British Industries asking for particulars of the proposals for giving effect to the recommendation made by the Imperial Conference that the functions of the Empire Marketing Board should be extended, so as to include the advertising throughout the Empire of goods produced in this country in addition to the advertising of Empire products in this country. The Federation have also approached the Empire Marketing Board as to whether they would be prepared to consider schemes for co-operative publicity as between the Empire Marketing Board on the one hand, and individual industries or groups of industries on the other.

DAMAGE estimated at about £1,000 was caused by a fire at the National Oil Refineries, Skewen, near Swansea, last week.

A PRESENTATION will be made to Dr. John A. Cranston, chairman of the Glasgow section of the Society of Chemical Industry, at the annual meeting of the section to be held in the Grosvenor Restaurant on Friday, March 6.

MEMBERS of the three sections of the Ceramic Society—pottery, refractories and building materials—will visit Germany from May 2—16 next, and will make a wide circular tour, beginning with Cologne and comprising the more important Rhine towns and Frankfort, Nuremberg, Dresden and Berlin.

UNIVERSITY NEWS: *Manchester*—Mr. W. W. Kay, B.Sc., M.B., Ch.B., who was for three years Assistant Director of the Government Wool Disinfecting Station at Liverpool, has been appointed Assistant Lecturer in Chemical Pathology. *Leeds.*—Mr. H. Millett, B.Sc., Ph.D. (Liverpool), has been appointed Research Assistant in Physical Chemistry.

THE WORLD PRODUCTION OF ZINC in the past year amounted to 1,413,691 metric tons, according to the Metal Company of Frankfort, as compared with 1,470,233 tons in the previous year. The American production declined from 668,832 tons to 605,042 tons, and that of Europe from 712,213 tons to 707,917 tons. The Australian output increased from 52,874 tons to 55,949 tons.

A DECREE of the Brazilian Provisional Government provides for an inventory of all stores of Government Departments with a view to the creation of a central purchasing bureau. The British Commercial Secretary at Rio de Janeiro states that if such a reform be subsequently effected, an entirely new complexion may be put upon purchases of public material, and that for this reason he is of opinion that it is of the greatest importance for British firms to be forewarned of the impending change.

IN REVIEWING the Progress Report on Forest Administration in the Punjab for the year ended March 31, 1930, the local Government report a drop of nearly Rs. 75,000 in the Government share of the profits of the Jallo Resin Factory, with the result that the total value of sales shows a big decrease of nearly Rs. 6½ lakhs as compared with the previous year. The drop in the profits of the Jallo Factory was due to general trade depression and to the competition of Swedish turpentine and the turpentine substitute, a by-product of petroleum.

THE THIRTY-SIXTH GENERAL MEETING of the Deutsche Bunsen Gesellschaft für angewandte physikalische Chemie, the asssociation of research workers, scientists and technologists in the field of applied physical chemistry will take place from May 25 to 27 next, in Vienna. The subject of the symposium will be: "Recent progress in the science of metallurgy, with particular reference to light metals." The arrangements have been undertaken by Geheimrat Prof. Dr. Dr.-Ing. h.c. Specketer, Director of the I.G. Farbenindustrie A.-G., managing director of the Griesheim Elektron Works.

PROFESSOR F. L. PYMAN, formerly Professor of Technological Chemistry at the Manchester College of Technology, and now Director of Research to Boots Pure Drug Co., lectured on Thursday, February 12, to members of the Manchester and District Section of the Institute of Chemistry on "Recent advances in medicinal chemistry." In the section of his lecture devoted to artificial or synthetic drugs, he referred to chemico-therapeutical work, which consisted in determining the ratio between the curative and the lethal dose of a drug. A great deal of work, he said, had been done in this connection on curative agents in malaria, and also on anæsthetics.

ACTIVATED ALUMINA, a specially prepared partially dehydrated aluminium trihydrate in the form of hard porous masses, has recently been developed by the Aluminium Research Laboratories, according to *Canadian Chemistry and Metallurgy*. The absorptive properties of partially dehydrated alumina in powder form have been known for many years, but because of its physical condition little commercial use was possible. The preparation of the material in the form of hard masses permits of grading into sizes ranging from a powder to pieces approximating 1½ inches in diameter. Its stability, high purity, inertness to chemical action, large surface area or porosity per unit volume, together with the affinity of alumina for vapours and gases, combine to form the basis of commercial merit for the product.

# Patent Literature

*The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.*

## Abstracts of Accepted Specifications

339,699. Dye Intermediates. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 24, 1929.

Aldehydes of the benzene and anthraquinone series containing easily replaceable halogen atoms are heated with acid amides or sulphonamides, or their mono-alkyl, aralkyl or aryl derivatives, in the presence of an acid-binding agent, with or without a diluent and catalyst, and the acidylamino or sulphamino products obtained are saponified. In an example, 5-nitro-2-chloro-benzaldehyde is heated with *p*-toluene-sulphonamide, potassium carbonate, copper powder and cuprous chloride, with or without nitrobenzene, to obtain 5-nitro-2-*p*-toluene-sulphamino-benzaldehyde. Benzamide similarly yields 5-nitro-2-benzoylamino, and phthalimide yields 5-nitro-2-phthalimino-benzaldehyde. These are saponified to 5-nitro-2-aminobenzaldehyde. Other examples are given.

339,760. Bismuth Salts. W. W. Groves, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 15, 1929.

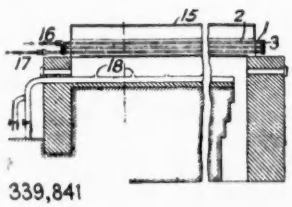
Basic bismuth-mercury compounds are obtained by treating a simple or complex bismuth salt with a soluble organic mercury compound not giving the characteristic reactions of the mercury ion, *e.g.*, mercuri-salicyl-allylamide-O-acetic acid, 4-mercuri-allyl-oxy-3-acetylamino-benzene-1-arsonic acid, 3 : 4-mercuri-thiobenzimidazole-1-arsonic acid, 3 : 4-mercury-thiobenzimidazole-1-carboxylic acid, 1 : 2-mercury-thiobenzimidazole-4-sulphonic acid, and meta-mercury-allyl-thiourea-benzoic acid. A detailed description is given of the preparation of the various organic mercury compounds employed.

339,823. Dyes. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, January 4, 1929.

1-Naphthaldehyde-2-sulphonic acid and its derivatives are obtained by boiling the corresponding 1-ω-amino-methyl-naphthalene sulphonic acid with sodium nitrate and oxidising the resulting naphth-alcohol-sulphonic acid with bichromate and sulphuric acid. These compounds are then condensed with an alkylated or aralkylated arylamine and the resulting leuco compound oxidised, possibly after sulphonation. Thus, sodium 1-naphthaldehyde-2 : 4-disulphonate is condensed with diethyl-aniline and the leuco compound oxidised with manganese dioxide, or with ethyl-benzyl-aniline and the leuco compound oxidised with lead peroxide. The 2-sulphonic acid may be used instead of the 2 : 4-disulphonate, and the leuco compound sulphonated. The products dye wool bluish-green.

339,841. Cracking Oils. F. P. E. S. Duplan, 58, Rue Bobillot, Paris. International Convention date, January 21, 1929.

Tubes 1 are arranged in three superposed layers in a cast iron block 2 to equalise the heating, and oil is passed through



339,841

them at a pressure which maintains it liquid at a temperature of 360° C. The speed varies from 6 to 72 cm. per second for a tube of 10 mm. diameter so that the oil is heated for 1 to 1·5 minutes only. The tubes are heated by gas burners 18 and an insulating sheet 15 is placed above the tubes.

339,826. Vulcanising Rubber. Deutsche Hydrierwerke Akt.-Ges., 163, Kantstrasse, Charlottenburg, Berlin. International Convention date, January 8, 1929.

Esters of cyclic alcohols such as the borneol ester of adipic acid, cyclohexanol esters of hydrophthalic acid, and cyclohexyl ester of benzoic acid are used as vulcanisation accelerators.

339,834. Preserving Rubber. B. F. Goodrich Co., 37, West 60th Street, New York, Assignees of P. C. Jones, 900, Chestnut Boulevard, Cuyahoga Falls, Ohio, U.S.A. International Convention date, January 21, 1929.

Rubber latex, or rubber before vulcanisation, or vulcanised rubber, is treated with tetra substituted hydrazines to retard ageing. These compounds are obtained by the controlled oxidation of secondary aromatic amines by the addition of the theoretical amount of oxidising agent, suitable compounds being tetraphenyl, tetrabenzyl, tetratolyl, tetrahydroxy tetraphenyl, tetrachlorphenyl, tetra (*p*-aminophenyl), dihydroxy-tetraphenyl, dihydroxy-phenyl-ditolyl, ditolyl-diphenyl and dianisyl-diphenyl hydrazines.

339,865. Driers. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, February 22, 1929.

Heavy metal or alkaline earth naphthenates are dissolved in the fatty acids of drying or semi-drying oils such as linseed, wood, soya-bean or poppy oils, *e.g.*, cobalt naphthenate in linoleic acid, and cobalt and manganese naphthenates in linoleuc and wood oil acids.

339,875. Destructive Hydrogenation. Naamlooze Vennootschap Bataafsche Petroleum Maatschappij, 30, Carel van Bylandtlaan, The Hague. International Convention date, March 11, 1929.

A catalyst for the destructive hydrogenation of carbonaceous materials is made by precipitating with ammonia a mixture of an aqueous solution of aluminium chloride and a solution of ferric chloride in dilute hydrochloric acid, and drying the precipitate till it contains 10–12 per cent. of water.

339,882. Allyl Alcohol Derivatives and Dioxyacetone. Schering-Kahlbaum Akt.-Ges., 170, Müllerstrasse, Berlin. International Convention date, February 23, 1929.

The condensation products of glycerol monohalogenhydrins, with acetone are distilled over caustic lime, or in the presence of an organic base such as quinoline or diethyl-aniline. Hydrogen halide is split off, and the corresponding derivatives of α-oxyallyl alcohol obtained. The products are converted into dioxyacetone by oxidation with perbenzoic acid.

339,922. Driers. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, June 14, 1929. Addition to 339,865.

Driers are made by dissolving heavy metal alkaline earth naphthenates in a mixture of drying or semi-drying oils and their fatty acids, *e.g.*, lead and manganese naphthenates may be dissolved in a mixture of linoleic acid and linseed oil.

339,926. Concentrating Sulphur Dioxide. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, May 15, 1929.

Gases containing sulphur dioxide are treated with a mixture of water and an aromatic amine such as aniline. The sulphur dioxide is absorbed and may be recovered by heating.

339,932. Synthetic Drugs. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Assigness of Deutsche Gold- und Silber Scheideanstalt vorm. Roessler, 7, Weissfrauenstrasse, Frankfort-on-Main, Germany. International Convention date, September 29, 1928.

Pyracridone is nitrated with a mixture of nitric acid and sulphuric acid to obtain a dinitro compound, which is reduced

with stannous chloride and hydrochloric acid to obtain the corresponding diamino compound, which is used for therapeutic purposes.

## Specifications Accepted with Date of Application

319,585. Yellow wool dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. September 21, 1928.

319,589. Vinyl esters of organic acids. Preparation of. E. I. Du Pont de Nemours and Co. September 22, 1928.

319,747. Vanillin, Production of. H. Pauly and K. Feuerstein. September 27, 1928.

342,247. Zeolites, Production of. W. W. Triggs. (*General Zeolite Co.*) July 27, 1929.

342,256. Protecting aluminium, magnesium or their alloys against the action of corrosive agents. C. Boulanger. November 10, 1928.

342,295. Malleable iron-chromium alloys, Manufacture of. P. R. Kuehnrich. October 25, 1929.

342,303. Fertilisers stable for storage and capable of being scattered, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) October 30, 1929.

342,315. Vat dyestuffs. C. Shaw, R. F. Thomson, J. Thomas and Scottish Dyes, Ltd. July 24, 1929.

342,318. Ammoniacal liquors obtained in scrubbing gases, Treatment of—and the recovery of fertilisers and other products therefrom. C. J. Hansen. August 20, 1929.

342,319. Condensing hydrocarbons. Imperial Chemical Industries, Ltd., T. S. Wheeler, J. McAulay, and W. Francis. August 21, 1929.

342,320. Extraction of hydrocarbons from coal. F. G. Renou. October 1, 1929.

342,329. Chlorinated hydrocarbons, Production of. Imperial Chemical Industries, Ltd., T. S. Wheeler, and J. Mason. October 24, 1929.

342,330. Nitro-phenyl derivatives of thiazole compounds, Manufacture of. Goodyear Tire and Rubber Co. February 6, 1929.

342,358. Alkali phosphates, Production of. Metallges. Akt.-Ges. November 2, 1928.

342,373. Substitution products of aromatic hydrocarbons, Manufacture of. W. W. Groves. (*I.G. Farbenindustrie Akt.-Ges.*). November 5, 1929.

342,375. Stable therapeutically valuable solutions containing antimony, Production of. I.G. Farbenindustrie Akt.-Ges. November 6, 1928.

342,378. Iron and steel articles which are subjected during manufacture to the action of a testing load, Manufacture of. Vereinigte Stahlwerke Akt.-Ges. December 31, 1928. Addition to 197,330.

342,379. Cyclic ketones of the acenaphthene series, and 1 : 4 : 5 : 8-naphthalene-tetracarboxylic acid, and derivatives thereof, Manufacture of. W. W. Groves. (*I.G. Farbenindustrie Akt.-Ges.*) November 6, 1929.

342,399. Solutions of salts of sulphonic acids, Preparation of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) November 11, 1929.

342,411. Diolefines, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) November 18, 1929.

342,466. Vat dyestuffs, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). December 18, 1929.

342,502. Rubber, Treatment of. Naugatuck Chemical Co. January 19, 1929.

342,524. Ammonium sulphate, Production of. D. Tyrer and Imperial Chemical Industries, Ltd. January 31, 1930.

342,545. Rotary furnaces for soda-recovery plants. J. Holmes and H. A. Kingcome. February 12, 1930.

342,551. 1-Hydroxy-4-halogen-anthraquinone-2-sulphonic acids, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). February 19, 1930.

342,586. Magnesium-cerium alloys, Production and refinining of. I.G. Farbenindustrie Akt.-Ges. April 15, 1929.

342,596. Cellulose acetate from acetic acid solutions thereof. Kodak, Ltd. (*Eastman Kodak Co.*) March 28, 1930.

342,609. Sodium and potassium in metallic state, Method of obtaining. D. J. Ylla-Conte. April 27, 1929.

342,617. Potash and alumina from leucite, Extraction of. F. Jourdan. February 7, 1930.

## Applications for Patents

***[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]***

Akt.-Ges. für Chemische Produkte vorm. A. Scheidemandel. Method of producing glue from bones. 4,606. February 13. (Germany, February 13, 1930.)

Anglo-Persian Oil Co., Ltd., Birch, S. F., Scott, W. D., and Thole, F. B. Production of ethylene oxides. 4,194. February 10.

Anode Rubber Co., Ltd., Dunlop Rubber Co., Ltd., and Purkis, F. T. Production of compositions containing rubber. 4,213. 4,214. February 11.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of stable orthoamino-hydroxy-aryl-arsenic acids. 4,457. February 12.

—— Manufacture of condensation products. 4,458. February 12.

—— Textile printing. 4,459. February 12.

Chemische und Seifenfabrik R. Baumheier Akt.-Ges. Production of condensation products. 4,430. February 12. (Germany, February 12, 1930.)

Coxon, T. Treatment of ammonia liquors. 4,329. February 11.

Dunn, J. S. Removal of arsenic from sulphur. 4,326. February 11.

Durand and Huguenin Akt.-Ges. Manufacture of dyestuffs. 4,578. February 13. (Germany, February 15, 1930.)

Fairweather, D. A. W., Scottish Dyes, Ltd., and Thomas, J. Dyes and dyeing. 4,187. February 10.

Girsewald, Conway, Baron von, Metallges Akt.-Ges., and Stahl, E. Production of sulphates. 4,120. February 10.

Goldberg, A. A., and Thorpe, J. F. Manufacture of anthraquinone derivatives. 4,030. February 9.

Goux, J. C. Transforming heavy hydrocarbons into products with low-boiling point. 4,574. February 13. (France, February 14, 1930.)

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Manufacture of alkyloxy-derivatives of 2:3-hydroxynaphthoic acid arylides. 4,041. February 9.

Gyngell, E. S., and Lessing, R. Separation of carbonaceous materials. 4,385. February 12.

Hill, L. G. Preparation of bleaching-powder. 4,378. February 12.

Hinchley, J. W., and Thomas, N. G. Apparatus for extraction of materials by means of volatile liquids. 4,367. February 12.

Hochofenwerk Lübeck Akt.-Ges. and Metallges Akt.-Ges. Production of ferro-phosphorous. 4,393. February 12. (Germany, March 13, 1930.)

I.G. Farbenindustrie Akt.-Ges and Johnson, J. Y. Manufacture of resins, balsams, and softening-agents. 4,296. February 11.

—— Manufacture of non-caking fertilisers. 4,297. February 11.

—— Manufacture of polymerization products. 4,298. February 11.

I.G. Farbenindustrie Akt.-Ges. Manufacture of cellulose ether lacquers. 4,064. February 9. (United States, February 10, 1930.)

—— Manufacture of wetting, etc., agents. 4,168. February 10. (Germany, February 10, 1930.)

—— Manufacture of sulphonic acids. 4,282. February 11. (Germany, February 11, 1930.)

—— Manufacture of triarylmethane dyestuffs. 4,289. February 11. (Germany, February 14, 1930.)

—— Manufacture of derivatives of cellulose, starch, etc. 4,435. February 12. (Germany, February 15, 1930.)

—— Manufacture of derivatives of cellulose, starch, etc. 4,579. February 13. (Germany, February 15, 1930.)

—— Manufacture of bismuth compounds of benzenearsinic acid-stibinic-acids. 4,580. February 13. (Germany, February 15, 1930.)

Imperial Chemical Industries, Ltd. and Piggott, H. A. Heterocyclic nitrogen compounds. 4,324. February 11.

Imperial Chemical Industries, Ltd., Piggott, H. A., and Rodd, E. H. Manufacture of dyes. 4,325. February 11.

Imperial Chemical Industries, Ltd., Valves. 4,327. February 11.

Imperial Chemical Industries, Ltd. and Jones, W. Production of motor spirit. 4,328. February 11.

Imperial Chemical Industries, Ltd. Treatment of ammonia liquors. 4,329. February 11.

—— Fuels for internal-combustion engines. 4,420. February 12.

—— Fireproofing materials made from bast, bark, etc. 4,627. February 13.

Jacob, A. Manufacture of sal ammoniac and soda. 4,616. February 13.

Rheinische Kampfer-Fabrik Ges. Production of camphene. 4,153. February 10. (Germany, March 21, 1930.)

Riedel and Co. Spezial-Fabrik für Galvanotechnik. Production of chrome and chrome coatings. 4,334. February 11. (Germany, February 11, 1930.)

Ruhrchemie Akt.-Ges. Transforming aliphatic hydrocarbons. 4,769. February 14. (Germany, February 14, 1930.)

Soc. Anon. pour le Traitment des Minerais Alumino Potassiques. Manufacture of phosphatic fertilizers. 4,615. February 13. (Switzerland, February 17, 1930.)

Techno-Chemical Laboratories, Ltd., and Testrup, N. Manufacture of peat products. 4,335. February 11.

Toledo Synthetic Products, Inc., and Triggs, W. W. Production of synthetic resins. 4,188, 4,189. February 10.

Weitz, H., Formic acid. 4,581. February 13.

# Weekly Prices of British Chemical Products

*The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.*

## General Heavy Chemicals

ACID ACETIC, 40% TECH.—£18 15s. per ton d/d address U.K. in casks.
ACID CHROMIC.—1s. per lb., less 2½% d/d U.K.
ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.
ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.
ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.
AMMONIUM BICHROMATE.—8½d. per lb. d/d U.K.
BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.
BLEACHING POWDER, 35/37%.—Spot, £7 19s. per ton d/d station in casks, special terms for contracts.
BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags. carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards).
CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d station in drums.
CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.
CHROMETAN.—Crystals, 3¼d. per lb. Liquor, £18 12s. 6d. per ton d/d U.K.
COPPER SULPHATE.—£25 to £25 10s. per ton.
METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 7d. to 1s. 11d. per gall.; pyridinised industrial, 1s. 9d. to 2s. 1d. per gall.; mineralised, 2s. 8d. to 2s. 11d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.
NICKEL SULPHATE.—£38 per ton d/d.
NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
POTASH CAUSTIC.—£30 to £33 per ton.
POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4¼d. per lb. nett d/d U.K., discount according to quantity; ground ½d. per lb. extra.
POTASSIUM CHLORATE.—3½d. per lb., ex-wharf, London, in cwt. kegs.
POTASSIUM CHROMATE.—8½d. per lb. d/d U.K.
SALAMMONIAC.—Firsts lump, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.
SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.
SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.
SODA CAUSTIC, SOLID, 76/77%.—Spot, £14 10s. per ton, d/d station.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE 97/98%.—£21 per ton.
SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.
SODIUM BICHROMATE CRYSTALS (CAKE AND POWDER)—3½d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.
SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.
SODIUM CHLORATE.—2¾d. per lb.
SODIUM CHROMATE.—3⅜d. per lb. d/d U.K.
SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.
SODIUM PHOSPHATE.—£14 10s. per ton, f.o.r. London, casks free.
SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.
SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton d/d station in drums. Crystals—Spot, £7 10s. per ton d/d station in returnable casks.
SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

## Coal Tar Products

ACID CARBOLIC CRYSTALS.—5d. to 6½d. per lb. Crude 60's 1s. to 1s. 1d. per gall. August/December.
ACID CRESYLIC 99/100.—1s. 9d. to 1s. 10d. per gall. B.P., 3s. 6d. per gall. 97/99.—Refined, 2s. 2d. to 2s. 3d. per gall. Pale, 98%, 1s. 8d. to 1s. 9d. Dark, 1s. 4d. to 1s. 4½d.
ANTHRACENE OIL, STRAINED (GREEN OIL).—4½d. to 4¾d. per gall.
BENZOLE.—Prices at works: Crude, 7½d. to 8½d. per gall.; Standard Motor, 1s. 3d. to 1s. 4d. per gall.; 90%, 1s. 4½d. to 1s. 5½d. per gall.; Pure, 1s. 7½d. to 1s. 8½d. per gall. (The above prices were operative from October 21 last).
TOLUOLE.—90%, 1s. 8d. to 1s. 9d. per gall. Pure, 1s. 10d. to 1s. 11d. per gall.
XYLOL.—1s. 8d. to 1s. 9d. per gall. Pure, about 1s. 11d. per gall.
CREOSOTE.—Standard specification, for Export, 5½d. per gall. f.o.b.; for Home, 4d. per gall. d/d.
NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent, 90/190, 1s. to 1s. 2d. per gall.
NAPHTHALENE.—Purified Crystals, £11 11s. per ton.
PITCH.—Medium soft, 45s. per ton, in bulk at makers' works.
PYRIDINE.—90/140, 3s. 6d. to 3s. 9d. per gall. 90/160, 3s. 3d. to 3s. 6d. per gall. 90/180, 1s. 9d. to 2s. per gall.

## Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.
ACID ANTHRANILIC.—6s. per lb. 100%.
ACID GAMMA.—Spot, 3s. 6d. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.
ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.
ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8½d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8½d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.
BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.
BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.
*o*-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
*m*-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
*p*-CRESOL 34·5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. 5d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra d/d buyer's works.
DINITROBENZENE.—7½d. per lb.
DINITROCHLORBENZENE.—£74 per ton d/d.
DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d. per lb.
DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
*a*-NAPHTHOL.—Spot, 1s. 11d. per lb. d/d buyer's works.
*B*-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.
*a*-NAPHTHYLAMINE.—Spot, 1s. per lb. d/d buyer's works.
*B*-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
*o*-NITRANILINE.—5s. 11d. per lb.
*m*-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
*p*-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 6½d. per lb., 5-cwt. lots, drums extra, d/d buyer's works.
NITRONAPHTHALENE.—9d. per lb.
R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.
SODIUM NAPHTHIONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.
*o*-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.
*p*-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.
*m*-XYLIDINE ACETATE.—3s. 4d. per lb., 100%.

## Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. to £8 per ton. Grey, £14 to £15 per ton. Liquor, 9d. per gall.
ACETONE.—£74 to £75 per ton.
CHARCOAL.—£6 5s. to £8 3s. per ton, according to grade and locality.
IRON LIQUOR.—10d. to 1s. 2d. per gall.
RED LIQUOR.—8d. to 10d. per gall.
WOOD CREOSOTE.—1s. 9d. per gall., unrefined.
WOOD NAPHTHA, MISCIBLE.—2s. 11d. to 3s. 1d. per gall. Solvent, 4s. per gall.
WOOD TAR.—£4 5s. per ton.
BROWN SUGAR OF LEAD.—£37 per ton.

## Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 2d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.
ARSENIC SULPHIDE, YELLOW.—1s. 7d. to 1s. 9d. per lb.
BARYTES.—£6 to £7 10s. per ton, according to quality.
CADMIUM SULPHIDE.—4s. 6d. to 5s. per lb.
CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.
CARBON BLACK.—3¼d. to 4 1/16d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity. drums extra.
CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 6d. per lb.
INDIARUBBER SUBSTITUTES, WHITE.—4⅝d. to 5⅛d. per lb.; Dark, 4⅛d. to 4⅞d. per lb.
LAMP BLACK.—£28 per ton, barrels free.
LITHOPONE, 30%.—£19 to £21 per ton.
SULPHUR.—£9 10s. to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.

VERMILION, PALE OR DEEP.—6s. 6d.-7s. per lb.
ZINC SULPHIDE.—8d. to 11d. per lb.

### Pharmaceutical and Photographic Chemicals

ACETANILIDE.—1s. 4d. per lb. for 1-cwt. lots.
ACID, ACETIC, PURE, 80%.—£37 5s. per ton d/d address U.K. in casks.
ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.
ACID, BENZOIC B.P.—1s. 9d. to 1s. 10d. per lb., for synthetic product. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 1d. to 1s. 1½d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 0¼d. per lb., less 5%.
AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.
AMMONIUM BENZOATE.—3s. 9d. per lb.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ARGENT. NITRAS, CRYSTALS.—1s. 1d. per oz.
ATROPHINE SULPHATE.—8s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BISMUTH CARBONATE.—8s. per lb
BISMUTH CITRATE.—7s. 6d. per lb.
BISMUTH SALICYLATE.—7s. 3d. per lb.
BISMUTH SUBNITRATE.—6s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 5s. per lb.
BISMUTH OXIDE.—9s. 10d. per lb.
BISMUTH SUBCHLORIDE.—9s. 7d. per lb.
BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2d. per lb.; 6 W. Qts., 11½d. per lb.; 12 W. Qts., 10d. per lb.; 36 W. Qts., 9½d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 4½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 7d. per lb. Prices for 1-cwt. lots.
CAFFEIN, PURE.—6s. 6d. per lb.
CAFFEIN CITRAS.—5s. per lb.
CALCIUM LACTATE.—B.P., 1s. to 1s. 6d. per lb., according to quantity.
CAMPHOR.—Refined flowers, 2s. 10d. to 3s. per lb., according to quantity; also special contract prices.
CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.
EMETINE HYDROCHLORIDE.—58s. 6d. per oz.
EMETINE BISMUTH IODIDE.—33s. per oz.
EPHEDRINE, PURE.—12s. 6d. to 13s. 6d. per oz.
EPHEDRINE HYDROCHLORIDE.—9s 9d. to 10s. 6d. per oz
EPHEDRINE SULPHATE.—9s. 9d. to 10s. 6d. per oz.
ERGOSTEROL.—2s. 6d. per gm.
ETHERS.—S.G. ·730—1s. to 1s. 1d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—27s. 6d. per oz.
HYDRASTINE HYDROCHLORIDE.—90s. per oz. for small quantities.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; fo r28-lb. lots.
IRON AMMONIUM CITRATE.—B.P., 1s. 11d. per lb., for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 9d. per lb. list price.
IRON PERCHLORIDE.—18s. to 20s. per cwt. according to quantity.
IRON QUININE CITRATE.—B.P., 8¼d. to 8¾d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light B.P., 36s. per cwt.
MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 14s. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 10s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb.
PARAFORMALDEHYDE.—1s. 8d. per lb.
PARALDEHYDE.—1s. 1d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENOLPHTHALEIN.—5s. to 5s. 2½d. per lb.
PILOCARPINE NITRATE.—10s. 6d. per oz.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—85s. 6d. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P., 1s. 9d. per lb. for 28-lb. lots.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.
POTASSIUM IODIDE.—16s. 8d. to 17s. 9d. per lb., as to quantity.
POTASSIUM METABISULPHITE.—50s. per cwt. d/d London, kegs free.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.
QUINOPHAN.—B.P.C., 14s. 6d. to 16s. 6d. per lb. for cwt. lots.
SACCHARIN.—43s. 6d. per lb.
SALICIN.—18s. 6d. per lb.
SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.
SODIUM BENZOATE B.P.—1s. 5d. per lb. for 1-cwt. lots.
SODIUM CITRATE.—B.P.C. 1911, 1s. 6d. per lb. B.P.C. 1923, and U.S.P., 1s. 10d. per lb. for 28-lb.. lots.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—85s. per cwt. net, ton lots, d/s of 5 cwt. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 7s. 3d. to 8s. per lb., according to quantity Natural, 12s. per lb.

### Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—9s. per lb.
AMYL ACETATE.—2s. 3d. per lb.
AMYL BUTYRATE.—4s. 9d. per lb.
AMYL CINNAMIC ALDEHYDE.—9s. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 9d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 9d. per lb.
BENZYL BENZOATE.—2s. 4d. per lb.
CINNAMIC ALDEHYDE NATURAL.—11s. 9d. per lb.
COUMARIN.—12s. per lb.
CITRONELLOL.—6s. 6d. per lb.
CITRAL.—6s. 6d. per lb.
ETHYL CINNAMATE.—6s. 9d. per lb.
ETHYL PHTHALATE.—2s. 6d. per lb.
EUGENOL.—8s. 9d. per lb.
GERANIOL.—6s. to 10s. per lb.
HELIOTROPINE.—5s. 9d. per lb.
PHENYL ETHYL ACETATE.—10s. per lb.
PHENYL ETHYL ALCOHOL.—8s. 6d. per lb.
RHODINOL.—38s. 6d. per lb.
SAFROL—1s. 3d. per lb.

### Prices of Essential Oils

ANISE OIL.—3s. 3d. per lb.
BERGAMOT OIL.—8s. 6d. per lb.
BOURBON GERANIUM OIL.—13s. 6d. per lb
CAMPHOR OIL.—White, 1s. 9d. per lb.; Brown, 1s. 3d. per lb
CANANGA.—Java, 8s. 3d. per lb.
CASSIA OIL, 80/85%.—4s. per lb.
CINNAMON OIL LEAF.—5s. 6d. per oz.
CITRONELLA OIL.—Java, 2s. 2d. per lb., c.i.f. Pure Ceylon, 2s. per lb.
CLOVE OIL, 90/92%.—7s. 3d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 9s. per lb.
LEMON OIL.—4s. per lb.
LEMONGRASS OIL.—3s. per lb.
PALMA ROSA OIL.—10s. per lb.
PEPPERMINT OIL.—Japanese, 4s. 6d. per lb.
PETITGRAIN.—6s. per lb.

# London Chemical Market

***The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co. Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.***

*London, February 19, 1931.*

THERE has been a fair amount of general inquiry, mainly for near delivery. The markets on the whole show very little alteration. Steadiness in values is still the main feature. Export business continues along quietly steady lines.

### General Chemicals

ACETONE.—The market is receiving a fair volume of business at about £60 to £65 per ton, according to quantity.

ACID ACETIC.—Continues in fairly active request at £36 5s. to £38 5s. per ton for technical 80%, with pure 80% quoted at £37 5s. to £39 5s. per ton, according to quantity.

ACID CITRIC.—There is no improvement in the demand and the price remains easy at about 1s. 1¼d. to 1s. 1¾d. per lb., less 5%.

ACID FORMIC.—In better request at about £38 per ton for 85% technical.

ACID LACTIC.—Business has been a little better with prices unchanged at £41 to £42 per ton for 50% by weight pale quality.

ACID OXALIC.—The market is firm at £30 7s. 6d. to £32 per ton, according to quantity, and there is a fairly active business passing.

ACID TARTARIC.—Only a small business is coming on the market with the prices about unchanged at 1s. 0¼d. to 1s. 1d. per lb., less 5%.

SULPHATE OF ALUMINA.—The market is unchanged at £7 15s. to £8 5s. per ton for 17/18%, iron free quality, and the demand is mainly on contract account.

ARSENIC.—Firm conditions are still a feature of this market with early delivery still difficult. The price is unchanged at about £19 to £19 10s. per ton.

CREAM OF TARTAR.—In steady demand at 87s. 6d. per cwt. ex warehouse, London.

COPPER SULPHATE.—There is rather a better demand with the market about unchanged at £22 to £22 10s. per ton, less 5% free on rails London.

FORMALDEHYDE.—There has been a steady trade at about £30 10s. to £31 per ton.

LEAD ACETATE.—This market is again steady with white at £34 5s. per ton and brown at £33 5s. per ton, and in a little better request.

LEAD NITRATE.—In small demand at about £29 10s. per ton.

LITHOPONE.—Demand is broadening with price fairly steady at £18 to £22 per ton, according to grade and quantity.

POTASH BICHROMATE.—Unchanged at 4¼d. per lb. with usual discounts for contracts.

CHLORATE OF POTASH.—The market is firm at the higher rates of £28 to £30 per ton, according to quantity, and there is a fairly active demand.

PERMANGANATE OF POTASH, NEEDLE CRYSTALS.—A steady trade is passing at 5½d. per lb.

PRUSSIATE OF POTASH.—The market continues firm at £63 10s. to £65 10s. per ton, according to quantity, and there is an active demand.

SODIUM BICHROMATE.—In steady request at 3½d. per lb., with the usual discounts for contracts.

SODA CHLORATE.—The market is very firm at the higher rates of £26 10s. per ton, and there is an active demand.

SODIUM HYPOSULPHITE.—Commercial quality is quoted at £8 10s. per ton, and photographic crystals at £14 5s., there being a steady demand.

SODIUM PRUSSIATE.—There is a fairly good demand at the firm rates of 4¾d. to 5½d. per lb. according to quantity.

SODIUM SULPHIDE.—Unchanged at £10 5s. to £11 5s. per ton for solid with broken quality £1 per ton extra, carriage paid.

TARTAR EMETIC.—In small demand at about 11d. per lb.

ZINC SULPHATE.—Unchanged at £11 to £11 10s. per ton with a little better demand.

### Coal Tar Products

THE coal tar products market remains inactive and uninteresting. Prices are unchanged, but we believe that with business in hand, it is possible to get a small reduction on the prices quoted below.

MOTOR BENZOL.—Remains at about 1s. 5½d. to 1s. 6½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Unchanged at about 1s. 2½d. to 1s. 3d. per gallon.

HEAVY NAPHTHA.—Quoted at about 1s. 1d. per gallon f.o.r.

CREOSOTE OIL.—Unchanged at about 3d. to 3½d. per gallon f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Worth about 1s. 8d. per gallon for the 98/100% quality, and about 1s. 6d. per gallon for the dark quality 95/97%.

NAPHTHALENES.—Unchanged at £3 10s. to £3 15s. per ton for the firelighter quallty, at about £4 to £4 5s. per ton for the 74/76 quality, and at about £5 per ton for the 76/78 quality.

PITCH.—Offered at 37s. 6d. to 42s. 6d. per ton, f.o.b. East Coast port.

### Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—The market continues steady with small buying for prompt requirements. Prices remain unchanged at £7/£7 2s. 6d. per ton, f.o.b. U.K. port in single bags, for neutral quality 20·6 per cent. nitrogen. *Home.*—As farmers are unable to get on to the land on account of the bad weather conditions, the purchases of sulphate of ammonia are still small and large buying is not anticipated until the weather improves. Some merchants are beginning to purchase in advance of their customers' requirements. The scale price of £9 10s. per ton, delivered to consumers' nearest station remains in operation.

NITRATE OF SODA.—The scale prices remain in operation in the various European markets, but on account of the low prices in operation for agricultural products deliveries are smaller than last year.

### Latest Oil Prices

LONDON, February 18.—LINSEED OIL closed weak and 17s. 6d. to 20s. per ton lower. Spot, ex mill, remained unchanged at £20 10s.; February and March were quoted at £18 7s. 6d.; April, £18 10s.; May-August, £19; September-December, £19 7s. 6d., naked. RAPE OIL was quiet. Crude extracted, £29; technical refined, £30 10s., naked, ex wharf. COTTON OIL was firm and 10s. higher. Egyptian crude, £17 10s.; refined common edible, £21 10s.; deodorised, £23 10s., naked, ex mill. TURPENTINE was quiet and unaltered. American, spot, 37s. 3d.; and March-April, 37s. 9d.; Russian, spot, 34s. 6d. per cwt.

HULL.—LINSEED OIL, naked, closed for spot at £18 10s.; February, £18 10s.; March-April, £18 15s.; May-August, £19 2s. 6d.; September-December, £19 10s.; Baltic, spot, unquoted. COTTON OIL, naked, Egyptian, crude, spot, £18; edible, refined, spot, £20; technical, spot, £20; deodorised, £22. CASTOR OIL, spot, 39s. 6d.; firsts, 34s. 6d.; seconds, 32s. 6d. PALM KERNEL OIL, crude, naked, 5½ per cent., spot, £23. GROUNDNUT OIL, crushed/extracted, spot, £23; deodorised, £27. SOYA OIL, crushed/extracted, spot, £19; deodorised, £22 10s. RAPE OIL, crushed/extracted, spot, £28 10s.; refined, spot, £30 10s. per ton. COD OIL, 19s. per cwt. TURPENTINE, 39s. per cwt.

### South Wales By-Products

THERE is slightly more activity in South Wales by-products, but, generally, business is still far from satisfactory. Pitch continues to have a fluctuating market and supplies are well in excess of demand. There is no change in values. Road tar has a better call with quotations unchanged round about 13s. per 40-gallon barrel. Refined tars have a fair and steady market, with quotations for gas works and coke-oven tar unchanged. Solvent-naphtha has a slightly better demand, but heavy has practically no call. There is no change in creosote and benzol demands. Patent fuel and coke exports remain unsatisfactory. Patent fuel prices, for export, are as follows:—21s. to 21s. 6d., ex ship Cardiff; 20s., ex ship Swansea and Newport. Coke prices are: Best foundry, 34s. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 17s. 6d. to 18s.

### Death of Dr. Alfred Holt

THE death occurred on Sunday at Cape Town of Dr. Alfred Holt, a well known Liverpool chemist and for many years on the council of the Society of Chemical Industry, and hon. treasurer of its Liverpool Section. In 1923, when the British Association met at Liverpool, he was joint hon. secretary with Mr. Edwin Thompson, the present Lord Mayor of the city, and during the war he was associated with Professor Baly as technical examiner for explosive factories in the North-Western Area. He was also the founder of Holt, Thompson and Co., Ltd., a firm which was for some years engaged in the manufacture of fine chemicals, chiefly salicylic acid and aspirin.

# Scottish Chemical Market

*The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

*Glasgow, February 17, 1931.*

STEADILY increasing inquiries are reported in the Scottish heavy chemical market, although tonnage involved is not great.

## Industrial Chemicals

ACETONE.—B.G.S.—£60 to £63 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at the same price, viz.: 3¼d. per lb., ex store. On offer from the Continent at 3¼d. per lb., ex wharf.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11¾d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material obtainable at round about £28 per ton, ex wharf. On offer for shipment from China at about £27 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £22 10s. per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £22 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £9 10s. per ton, c.i.f. U.K. ports. For Continental materials our price would be £8 10s. per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £33 per ton, ex store. Continental on offer at about £32 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £34 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £46 per ton, carriage paid.

LEAD, ACETATE.—White crystals quoted round about £38 to £39 per ton ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE.—GROUND CALCINED.—Quoted £9 7s. 6d. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 1s. 8d. per gallon less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £25 10s. per ton ex store. Offered from the Continent at £24 15s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £25 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf.

SODA CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums, all carriage paid buyer's station, minimum four-ton lots. For contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3½d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Chilean producers now offer at £10 per ton, carriage paid, buyer's sidings, minimum six-ton lots.

SODIUM PRUSSIATE.—Quoted 5½d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £19 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

## Scottish Coal Tar Products

REFINED tar has been in better demand for both home and export, but prices are unchanged. Other products remain without alteration.

*Cresylic Acid.*—Small quantities are changing hands but position continues easy. Pale, 99/100%, 1s. 6½d. to 1s. 7½d. per gallon; pale, 97/99%, 1s. 5½d. to 1s. 6½d. per gallon; dark, 97/99%, 1s. 4½d. to 1s. 5½d. per gallon; high boiling, 1s. 7d. to 1s. 9d. per gallon; all f.o.r. makers' works.

*Carbolic Sixties.*—No business is being placed and value is nominal at 1s. 6d. per gallon for best grades.

*Creosote Oil.*—Demand continues small but steady. Specification oil, 2½d. to 2¾d. per gallon; gas works ordinary, 3¼d. to 3¾d. per gallon; washed oil, 3d. to 3¼d. per gallon; all in bulk ex works.

*Coal Tar Pitch.*—Quotations are easy at 42s. 6d. per ton, f.a.s. Glasgow, for export, and about 45s. per ton f.o.r. works, for home trade.

*Blast Furnace Pitch.*—Controlled prices are unaltered at 30s. per ton f.o.r. works for home trade, and 35s. per ton f.a.s. Glasgow for export.

*Refined Coal Tar.*—Enquiries are more numerous for both home and export. Quotations range from 2¾d. to 3d. per gallon ex works.

*Blast Furnace Tar.*—Production is low and price is unchanged at 2¾d. per gallon f.o.r.

*Crude Naphtha.*—Available supplies command 4¼d. to 4½d. per gallon.

*Water White Products.*—Business is quiet and prices are irregular. Motor benzol is 1s. 4d. to 1s. 4½d. per gallon; 90/160 solvent, 1s. 2½d. to 1s. 3½d. per gallon; 90/190 heavy solvent, 1s. 0½d. to 1s. 1d. per gallon; all ex makers' works in bulk quantities.

## "The Harnessed Flame"

THIS is the appropriate title of an arresting and well-produced pamphlet issued by the Gas Light and Coke Co., 1931, as a record of the progress of this great organisation. The story of the wonderful engineering and chemistry on which the gas industry and its by-products branches are founded is told interestingly and in non-technical terms, accompanied by many striking illustrations, and emphasis is placed on the many modern industrial applications of gas. As the writer remarks, "'Gas or Electricity' used to be a cry some years ago, but it is now becoming more and more widely recognised that the cry should be 'Gas *and* Electricity.'"

## Chinese Tariff Changes

### New Import Duties

THE following are the import duties on chemicals in the new tariff of the Republic of China, in force as from January 1 last (specific rates are expressed in gold units of a fixed value of 19·7265 pence sterling. Picul=133⅓ lb. avoirdupois) "N.o.p.f." stands for "Not otherwise provided for.") :—

| | Gold units. |
|---|---|
| Acetylene, in cylinder or other packing | 10 per cent. ad val. |
| Acid, acetic ....picul | 2·90 |
| Acid, boracic :— | |
| (*a*) In packages of not less than 7 lb. each ....picul | 2·20 |
| (*b*) In packages of less than 7 lb. each | 10 per cent. ad val. |
| Acid, carbolic | 12½ per cent. ad val. |
| Acid, hydrochloric (*i.e.*, muriatic) :— | |
| (*a*) In bulk ....picul | 0·55 |
| (*b*) In other packings | 7½ per cent. ad val. |
| Acid, nitric ....picul | 1·60 |
| Acid, oxalic | 7½ per cent. ad val. |
| Acid, sulphuric ....picul | 0·55 |
| Alum, chrome | 7½ per cent. ad val. |
| Alumina, sulphate of | 7½ per cent. ad val. |
| Ammonia, anhydrous | 7½ per cent. ad val. |
| Ammonia, liquid :— | |
| (*a*) In bulk ....picul | 2·80 |
| (*b*) In other packings | 7½ per cent. ad val. |
| Ammonia, chloride of (*i.e.*, sal ammoniac) ....picul | 2·00 |
| Ammonia, sulphate of ....picul | 0·74 |
| Antimony trisulphide | 5 per cent. ad val. |
| Barium, carbonate of | 7½ per cent. ad val. |
| Barium, chloride of | 7½ per cent. ad val. |
| Bleaching powder (*i.e.*, chloride of lime) | 7½ per cent. ad val. |
| Borax, crude or refined ....picul | 1·40 |
| Calcium, carbide of ....picul | 1·40 |
| Calcium, chloride of | 7½ per cent. ad val. |
| Chlorine, liquid | 7½ per cent. ad val. |
| Copper, sulphate of ....picul | 1·90 |
| Fertilisers, chemical or artificial n.o.p.f. | 7½ per cent. ad val. |
| Glycerine :— | |
| (*a*) In packages of not less than 28 lb. each ....picul | 5·40 |
| (*b*) In packages of less than 28 lb. each | 15 per cent. ad val. |
| Insecticides and disinfectants | 12½ per cent. ad val. |
| Manganese, peroxide of | 5 per cent. ad val. |
| Naphthalene....picul | 1·70 |
| Oxygen, in cylinder or other packing | 10 per cent. ad val. |
| Phosphorus....picul | 5·80 |
| Potash, carbonate of | 10 per cent. ad val. |
| Potash, caustic | 10 per cent. ad val. |
| Potash, chlorate of....picul | 0·85 |
| Potassium, bichromate of....picul | 3·00 |
| Saltpetre ....picul | 2·50 |
| Soda ash....picul | 0·77 |
| Soda, bicarbonate of, in bulk....picul | 1·30 |
| Soda, bichromate of | 7½ per cent. ad val. |
| Soda, bisulphite of (solid or liquid) | 10 per cent. ad val. |
| Soda, caustic ....picul | 1·50 |
| Soda, crystal ....picul | 0·85 |
| Soda, crystal, concentrated ....picul | 2·00 |
| Soda, hydrosulphite of | 10 per cent. ad val. |
| Soda, nitrate of (Chile saltpetre) ....picul | 0·79 |
| Soda, peroxide of | 10 per cent. ad val. |
| Soda, silicate of ....picul | 1·00 |
| Soda, sulphate of | 15 per cent. ad val. |
| Soda, sulphide of ....picul | 1·10 |
| Soda, thiosulphate of (known as hyposulphite) | 10 per cent. ad val. |
| Spirits of wine, rectified spirits or alcohol, and rum for industrial uses (including unsweetened arrack, methylated spirits, wood alcohol, and fusel oil....Imp. gallon | 0·24 |
| Sulphur :— | |
| (*a*) Crude (lumps or powder)....picul | 0·71 |
| (*b*) Others | 10 per cent. ad val. |
| Chemicals and chemical compounds, n.o.p.f. | 12½ per cent. ad val. |
| Medicines, drugs, and medicinal substances, compounds, and preparations, n.o.p.f. | 25 per cent. ad val. |
| Aniline dyes, and other coal tar dyes, n.o.p.f. | |
| Bark, mangrove ....picul | 0·56 |
| Bark, plum-tree ....picul | 0·97 |
| Bark, yellow (for dyeing)....picul | 2·10 |
| Blue, Paris or Prussian....picul | 15·00 |
| Bronze powder ....picul | 14·00 |
| Carbon black (*i.e.*, lampblack) ....picul | 4·90 |
| Chrome yellow | 12½ per cent. ad val. |
| Cinnabar ....picul | 21·00 |

## Cause of Castleford Explosion

### The Home Office Report

THE Home Office Report on the explosion at the factory of Hickson and Partners, Ltd., at Castleford, Yorkshire, on July 4, 1930, has just been issued (H.M. Stationery Office. Price 9d.) and is the work of Mr. S. H. Newman, Engineering Inspector of Factories, and Dr. H. E. Watts, Inspector of Explosives. It will be remembered that the explosion, which occurred in the acid mixing plant, resulted in the death of 13 men, injury to about 50 others and very extensive damage to the town.

The conclusion reached by the inspectors is that the explosion was due to an excessive quantity of nitro body having been carried from an acid storage tank to the acid mixer. The report declares that unless precautions such as those indicated by the inspectors are taken to prevent an undue accumulation of nitro body in storage tanks dangerous conditions must result.

Normally the process of mixing nitric and sulphuric acids is a safe one, and in order to produce fire and explosion it would be necessary for some organic matter to be present in the mixer, and thus convert the harmless process of acid mixing into the process of nitration, which becomes dangerous if uncontrolled. The inspectors are of opinion that the probable cause of the explosion was the introduction of nitro body from the sulphuric acid storage boiler No. 28 into the acid mixer.

### Recommended Precautions

The inspectors state: "the collection of a certain amount of nitro body in the waste acid storage tanks is inevitable, and it should be the first care of the factory management to see that no undue accumulation of this body occurs. In this case the normal procedure of sampling does not appear to have been followed, and it is just possible that if proper sampling had been carried out the presence of the nitro body in the acid mixer might have been detected."

If it is desired to make mixed acid by using waste acid from a nitration process, and this contains nitro body, then the addition of the requisite quantity of nitric acid should be regarded as a nitration process and appropriate precautions taken, namely :—

(1) The nitro body which collects in the nitration waste acid storage tanks should be removed regularly and not allowed to accumulate.

(2) The vessel in which the operation of mixing takes place should be fitted with efficient stirring gear, and also adequate means of cooling by the provision of cooling coils or water jacket or both.

(3) No waste acid should be stored, and no nitro body allowed to collect in a tank which supplies sulphuric acid to a mixer unprovided with any means of cooling.

(4) In all such mixing plant the construction should be such that wood and other oxidisable material should be excluded.

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## Wages in the Dyeing Industry

A MEETING of the executive of the dyeing trade unions at Bradford on Saturday received a report of the negotiations of their representatives with those of the employers on the subject of measures to be taken for the re-establishment of the industry. The employers' final offer was for a reduction in gross wages of 10 per cent. and a letter has since been sent to them with a refusal to consider any variation of the present wages agreement.

Mr. Arthur Shaw, secretary of the dyeing unions, stated that the original proposals of the employers were that wages should be reduced 15 per cent. In the negotiations the unions' representatives had submitted that the unions had co-operated in schemes of rationalisation and that there should be co-operation between the various employers' associations and the merchants, a large number of the operations being redundant. The unions had also asked during the negotiations that the employers should make a gesture by declaring that, for any period the workers were asked to accept reduced wages, the ordinary shareholders should not be paid any dividend, inasmuch as during the past ten years there had been great prosperity in the trade and shareholders in the four large associations involved had received dividends amounting to £8,680,448 on a share issue of £6,343,923.

# Manchester Chemical Market

[From Our Own Correspondent.]

*Manchester, February 19, 1931.*

The end of the Lancashire cotton lock-out has been welcomed by chemical traders, for there was a real danger that operations at bleaching and finishing works, which had already been affected, would be more seriously interfered with. As it is, where deliveries of contract chemicals during the past week or two had been adversely influenced by the trouble, the position is now pretty well back to normal. There is a moderate inquiry for the leading lines of heavy products in circulation.

### Heavy Chemicals

Bichromate of soda is moving off in moderate quantities, and values are maintained on the basis of 3¾d. per lb., less discounts of 1 to 2½ per cent. No more than a quiet trade is reported in the case of hyposulphite of soda, with the commercial grade offering at from £9 to £9 5s. per ton and the photographic at about £15. Phosphate of soda is attracting limited attention without any further change in the price position, current quotations being at round £10 per ton for the dibasic material. With regard to prussiate of soda, prices in this section keep firm at from 4¾d. to 5¼d. per lb., and a fair amount of business is being put through. Caustic soda is well held at from £12 15s. to £14 per ton, according to quantity and in contract lots, and quietly steady deliveries of this material are being made. Not a great deal of interest is being displayed in the case of sulphide of sodium; the 60-65 per cent. concentrated solid quality ranges from about £9 to £9 10s. per ton and the commercial grade at round £8. Alkali keeps up in the neighbourhood of £6 per ton, and the movement is about up to its recent level. Saltcake meets with a quiet demand, with prices about unchanged at from £2 15s. to £3 per ton. Chlorate of soda meets with a moderate inquiry, and prices are steady at about £26 10s. per ton. Bicarbonate of soda is firm at round £10 10s. per ton, and fair sales of this material are being made.

Among the potash products, caustic is on offer this week at £28 10s. per ton, with buying interest on moderate lines. This applies also to carbonate, current quotations for which are at round £25 per ton. There has been no alteration in the price position of chlorate of potash, and a quiet trade is being done at about £27 10s. per ton. Permanganate of potash is the subject of a moderate inquiry, with offers of the B.P. grade at about 5¾d. per lb. and of the commercial product at 5¼d. There is a fair demand about for bichromate of potash, and quotations in this section are steady at 4¼d. per lb., less 1 to 2½ per cent. Yellow prussiate of potash is firm at from 6¾d. to 7¼d. per lb., according to quantity, with business about up to its recent level.

A moderate demand is reported in the case of arsenic, and prices are firm at from £19 to £19 10s. per ton, at the mines, for white powdered, Cornish makes. Inquiry for sulphate of copper this week has not been active, but values are nominally unchanged at about £21 per ton, f.o.b. Nitrate of lead is slow at up to £29 10s. per ton, with a quiet trade passing in the acetates at from £33 10s. to £34 15s. per ton for the brown material and £33 17s. 6d. to £35 15s. for the white. There has been no improvement in the position for the acetates of lime, and quotations are still easy in tendency, with the brown grade at round £7 5s. per ton and the grey at from £13 10s. to £14 per ton.

### Acids and Tar Products

Citric acid keeps reasonably steady at the moment at 1s. 2d. per lb., although the demand is quiet. This is also the case with tartaric acid, values of which remain at round 11½d. per lb. Business in oxalic acid is rather subdued, but prices keep up at about £1 12s. per cwt., ex store. Acetic acid is well held at from £51 per ton for the glacial technical quality and about £37 for the 80 per cent. commercial.

Among the by-products, pitch is in quiet request at 40s. per ton, f.o.b., with creosote oil in moderate demand at from 3d. to 4d. per gallon, naked, according to quality. Solvent naphtha is in quiet call at about 1s. 2d. per gallon. There is not much business offering in the carbolic acid section, with crystals at round 5d. per lb., f.o.b., and crude 60's at 1s. 2d. per gallon, naked.

# Company News

Reckitt and Sons, Ltd.—A final dividend is recommended on the ordinary shares of 10 per cent., making 21¼ per cent. for the year, plus a bonus of 1¼ per cent.

Shawinigan Water and Power Co.—The directors announce a dividend on the common shares of $0.63 for the quarter ended March 31, payable on April 10.

Eastman Kodak of New Jersey Co.—The following dividends, payable on April 1, have been declared by the directors:—Regular dividend of 1½ per cent. on the preferred stock; regular dividend of $1.25 per share on the common stock, and an extra dividend of $0.75 per share.

Bradford Dyers' Association, Ltd.—After providing for an estimated amount in respect of income tax and other contingencies, the directors report that profits for the year ended December 31 last amounted to £147,300, against £538,255 in 1929. Adding the amount brought in, there is £484,505, from which is deducted debenture interest and depreciation, leaving £226,556. The directors have transferred £94,116 from dividend equalisation reserve, and recommend a final ordinary dividend of 5d. per share, making 4⅛ per cent. for the year, against 8⅛ per cent. in 1929, and leaving £99,094 to go forward, against £337,205 brought in.

Borax Consolidated, Ltd.—For the twelve months ended September 30 last, the directors state that the balance of profit and loss, after providing for all management and administration expenses, is £163,447 2s. 0d. The requirements for the debenture interest for the year and the interim dividend on the preference shares paid on May 1, 1930, amounted to £123,048, leaving, with the amount brought forward, a sum to be dealt with of £249,073. To buildings, plant, etc., depreciation reserve account there has been placed the sum of £30,000; to the credit of the debenture stock redemption sinking fund the annual premium of £5,825. There remains to the credit of profit and loss account the sum of £213,248; out of which a final dividend on the preference shares was paid on November 1, 1930, leaving a balance of £191,248, which the directors propose to carry forward to the next account.

Redfern's Rubber Works, Ltd.—The annual meeting was held at Hyde, Cheshire, on February 14. Mr. Wilfred E. Redfern (chairman of the company), who presided, said the year had opened exceptionally well for them and the increase of business was steadily maintained until November, when there was a noticeable falling off of orders as compared with the corresponding period in 1929. The net profits for the year, after providing for depreciation and loan interest, were £30,247, an increase of over £7,000 on the profit for 1929. The directors felt that this result would be considered satisfactory by all members of the company, especially when it was remembered that the year had been marked by difficult trading conditions and a falling rubber market. With regard to the raw rubber position, the chairman explained that the company had bought rubber to cover its requirements for some time ahead, but before the end of the year the price of the raw commodity had fallen still further and they had to write down the stocks to the lower prices ruling at the time of stock-taking. He did not believe that very cheap rubber helped the company. The disturbed and depressed conditions of all basic industries, he said, was affecting the company's trade at home, and although they had endeavoured to regain the export trade, the high tariffs which was levied on rubber goods in most foreign countries made it impossible to export any volume of goods. The report and the statement of accounts were adopted and a balance dividend of 3¾ per cent., making 7½ per cent. for the year was declared on the A. and B. preference shares and 6¼ per cent. on the ordinary shares, making 10 per cent. for the year.

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### The Pure Rivers Society

The first annual of the Pure Rivers Society (1930) deals with the problem of river pollution from several points of view, and mentions particularly the effects in the case of artificial silk works, sugar beet factories, oil works, etc., and pleads for the protection of rivers and streams. Mr. J. C. Squire contributes some verses on "The Brook (Twentieth Century)."

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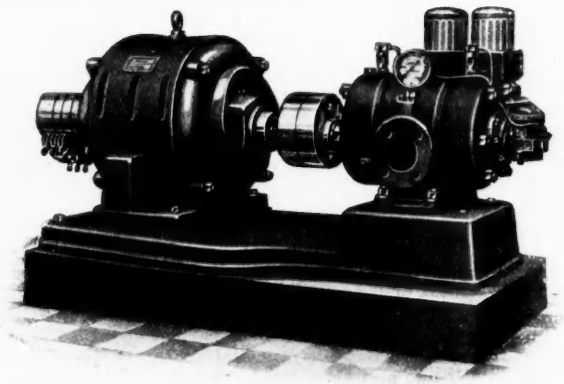

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# New Chemical Trade Marks

### Applications for Registration

*These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.*

*Opposition to the Registration of the following Trade Marks can be lodged up to March 4.*

POLEFINAL.

518,709. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. I.G. Farbenindustrie Aktien Gesellschaft (a joint stock company organised under the laws of Germany), Mainzerlandstrasse 28, Frankfort-on-Main, Germany; manufacturers. December 15, 1930.

*Opposition to the Registration of the following Trade Marks can be lodged up to March 18, 1931.*

MOWITAL.

519,633. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. I.G. Farbenindustrie Aktiengesellschaft (a joint stock company organised under the laws of Germany), Mainzerlandstrasse 28, Frankfort-on-Main, Germany; manufacturers. January 20, 1931.

# Petrographic Treatment of Coal

### Possibilities for Gas and Oil Production

A PAPER on "The Petrographic Treatment of Coal: The Mechanical Separation of Coal into its Constituents and their Commercial Applications," by John Strevens, was read before a meeting of the Institute of Fuel in the Rooms of the Chemical Society, Burlington House, London, on Wednesday, February 11. The author pointed out that the mechanical separation of coal into Vitrain, Clarain, Durain, and Fusain, was possible by means of elastic percussion, and the methods worked out for this were both simple and economically sound. The best method was the use of pendulum mills in association with preliminary dry cleaning where the ash content of coal was high.

Petrographic separation, especially for those of our Dominions where the coals are associated with Cannels and torbanites, brings nearer the stage of economic production of oil from solid carbonaceous material. For countries poor in coking coals it opens a way to produce cokeable material from such deposits by removal of Durain. Durain itself, being a valuable raw material for gas producers and oil extraction as well as having certain other uses in "blending" for coking purposes, is not likely to lack ever increasing markets, whilst Fusain will always be considered as a by-product.

To those collieries deficient in high grade bituminous and coking coals, but rich in the younger and higher volatile weak to non-coking coals, petrographic treatment should particularly appeal. Here it should be possible to purchase cheap run of mine coal, which is the least subject to fluctuating market conditions and therefore capable of being purchased on long dated contracts, and work it up into products of value. Thus both Canada and S. Africa could ultimately expect to produce from their own coals all the gas coal they need and vitrains sufficiently rich in coke forming constituents to yield a good furnace coke. By its adoption on a wide scale, it is not a fantastic picture to visualise the centres of gravity of the coal industry shifting as deposits suitable for such treatment are opened up, besides the throwing of a lesser strain on the known good coking coal deposits and giving them a longer life irrespective of the rate of growth of the steel industry.

# Chemical Trade Inquiries

***These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.***

LATVIA.—The Latvian Road Administration is calling for tenders to be presented in Riga by March 12 and March 17 next for the supply of 900 metric tons of bitumen and 100 metric tons of bitumen emulsion. (Ref. No. B.X. 7,015.)

# Commercial Intelligence

***The following are taken from printed reports, but we cannot be responsible for any errors that may occur.***

## Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

DEVONSHIRE BARYTA CO., LTD., London, W.C. (M., 21/2/31.) Reg. February 6, £5,000 deb., to B. Laporte, Ltd., Kingsway, Luton; charged on properties at Bridford and Christow, also general charge. *Nil. January 5, 1931.

NITRATE PROCESSES, LTD., London, E.C. (M., 21/2/31.) Registered February 4, £10,000 debentures; general charge. *£13,860. January 13, 1931.

### Satisfaction

POLLOPAS, LTD., Nottingham. (M.S., 21/2/31.) Satisfaction registered February 7, £25,000, etc., registered October 17, 1930.

## London Gazette, &c.

### Companies Winding Up Voluntarily

METAFILTERS, LTD. (C.W.U.V., 21/2/31.) Creditors' claims to L. C. Stewart, of Avenue Chambers, Southampton Row, London, W.C.1, the liquidator of the company, by March 6

RIVERSIDE DYEING AND FINISHING CO., LTD. (C.W.U.V., 21/2/31.) By reason of its liabilities. February 9. R. R. Smethurst, 21, Spring Gardens, Manchester, nominated liquidator.

### Notice of Intended Dividend

STOTT, Milton, and SYKES, Herbert, carrying on business in co-partnership as MILTON STOTT AND CO., at Oxford Works, Siddal, Halifax, manufacturing chemists. Last day for receiving proofs, February 25. Trustee, C. P. Spencer, Palatine Chambers, 6, Market Street, Halifax.

### Companies Winding Up

ANGLO-GERMAN PHARMACEUTICAL PRODUCTS CORPORATION, LTD. (C.W.U., 21/2/31.) Meetings, February 23, at 33, Carey Street, Lincoln's Inn, London, W.C.2; creditors, 11.30 a.m., and contributories, 12 noon.

LEWIS JAMESON AND CO., LTD. (C.W.U., 21/2/31.) Meetings, February 27, at 33, Carey Street, Lincoln's Inn, London, W.C.2; creditors, 11.30 a.m., and contributories, 12 noon.

## New Companies Registered

CLAYTON AND STEVENS, LTD., 15, Borough High Street, London, S.E.1. Registered February 14. Nominal capital, £1,000 in £1 shares. To acquire the business of a rubber manufacturer, manufacturing, analytical and consulting chemist, agent, factor and merchant carried on by H. P. Stevens as "Clayton and Stevens," at 15, Borough High Street, London. Directors: H. P. Stevens and W. H. Stevens.

KEMSOL IONISED IODINE CO., LTD., 34B, Gabriels Hill, Maidstone. Registered February 14. Nominal capital, £3,000 in 2,750 ordinary shares of £1 each and 5,000 deferred shares of 1s. each. To acquire the business now carried on at Langley Park, Langley, Kent, as "J. Cavendish Molson," and to carry on the business of manufacturers of Kemsol brand of ionised iodine and other products, etc. Directors: A. F. Corfe, F. D. M. Hocking, A. R. Pym, Madeline M. C. C. Molson.

### Creosote Oil for Lithuania

His Majesty's Consul at Kovno reports that the Lithuanian Railway Administration invite tenders, to be presented in Kovno by February 26, 1931, for the supply of 1,550 tons of creosote oil. Firms desirous of offering material of United Kingdom manufacture can obtain further particulars upon application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. (Reference number F.X. 1041 should be quoted.)